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TEXTILE WORLD RECORD

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THE TEXTILE-FINISHING MACHINERY COMPANY

17 Exchange Place, Providence, R. I.

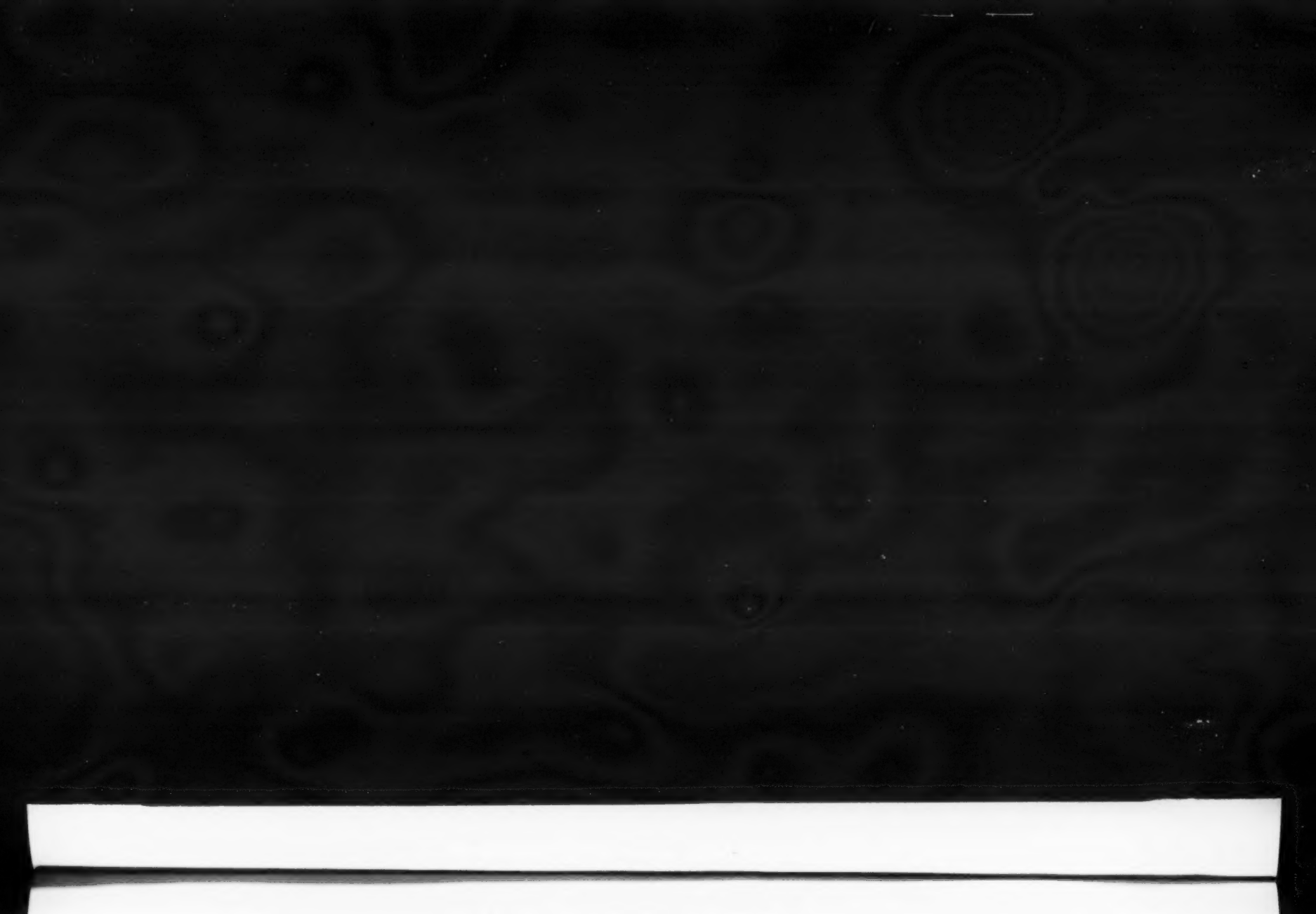
INCORPORATED FOR THE MANUFACTURE OF

BLEACHING, DYEING, DRYING AND FINISHING MACHINERY

CONTROLLING THE PLANTS FORMERLY OPERATED BY

THE GRANGER FOUNDRY AND MACHINE CO., Providence, R. I.
THE THOMAS PHILLIPS CO., Providence, R. I.
THE RUSDEN MACHINE CO., Warren, R. I.
THE PHENIX IRON FOUNDRY, Providence, R. I.

For Full Line of Machinery, See Inside Back Cover Page



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DRYING AND
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Drying Machines with Copper and Tinned Steel Cylinders.

Continuous Steaming Machines (Patented).

Open Soaping Machines.

Color Kettles with Stirrers. Padding Machines.

Oil and Gas Singeing Machines. Long and Short Chain System of Warp Dyeing.

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Tentering Machines for Ginghams, Plaids, Etc. Tentering Machines for Worsted and Woolen Goods. Tentering Machines for Lawns, Etc. and having Patent Vibratory Motion. The above with either pin, spring clamp, or patent automatic clamp chain.

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FOR YARN AND CLOTH.

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(W. P. Simpson, Patentee).

For use in connection with Singeing Machines, Soaping Machines, Drying Machines, Etc.

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REVOLVING FLAT CARDS,
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Complete Textile Equipment and Plans for Cotton Mills.

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SPINNING FRAMES with caps, rings or flyers and any kind of spindles for long or short wool, and any gauge of rollers.
DANDY ROVERS and REDUCERS with all latest improvements.
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GILL-BOXES for preparing before combing, and finishing afterwards.
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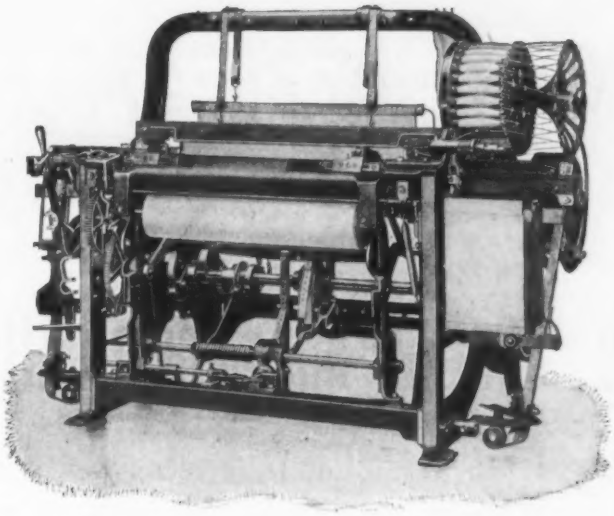
ILLUSTRATED CATALOGUES SENT ON APPLICATION.



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NORTHROP LOOM

ALTHOUGH our order list lengthens and strengthens, we do not adopt the simple and inexpensive plan of building without change, but continually add improvements whenever possible. A careful study of the above illustration will prove of interest to adepts in the Art of Weaving.

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We beg to inform the trade that our

Automatic Shuttle and Loom Attachment

is now on exhibition at our

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Where it can be seen in operation on Cotton, Silk and Worsted Looms of different makes. An inspection of these looms will convince every manufacturer of the following

GREAT ADVANTAGES:

1. Our device can be put on any modern Cotton, Silk or Worsted Loom.
2. Our shuttles change on the pick while the loom is running at regular speed and absolutely *leave no broken picks.*
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4. Our attachment is so *very simple* that it needs no more care than an ordinary loom and there is *no intricate mechanism* in our attachment which is liable to come out of order.
5. A weaver can attend, without extra exertion, to a *greater number of looms* with our device than with an ordinary loom.
6. It thus enables the weaver to earn *more wages.*
7. It is *time saving* and gives an *increase in the production* which is very considerable.
8. It reduces the manufacturing expenses *to a large extent.*
9. *Waste* on the quills is *reduced* to almost nothing.
10. As the loom stops less frequently, its operation is more regular, consequently producing *better* goods and also keeping the *looms in better condition.*

The superiority of our Automatic Shuttle and Loom Attachment over all existing similar devices is its simplicity and the fact that it absolutely leaves no mispicks whatsoever, which has been a cause of surprise and admiration to all experts who have seen our Attachment in operation.

We Guarantee Our Automatic Shuttle and Loom Attachment to Do Exactly What We Mention Above.

For inspection, please communicate with our Office,
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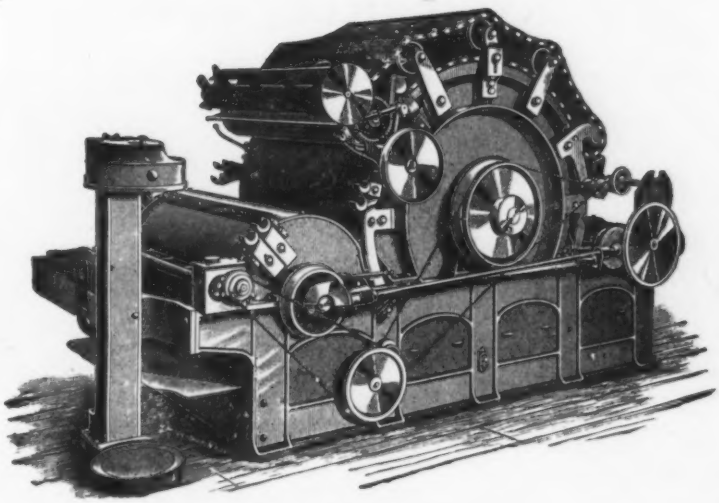

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Drawing Frames, Spinning
Frames, Mules and
Looms,

INCLUDING

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Southern Office, Charlotte, S. C.

THE

WHITIN MACHINE WORKS,

Cotton Machinery

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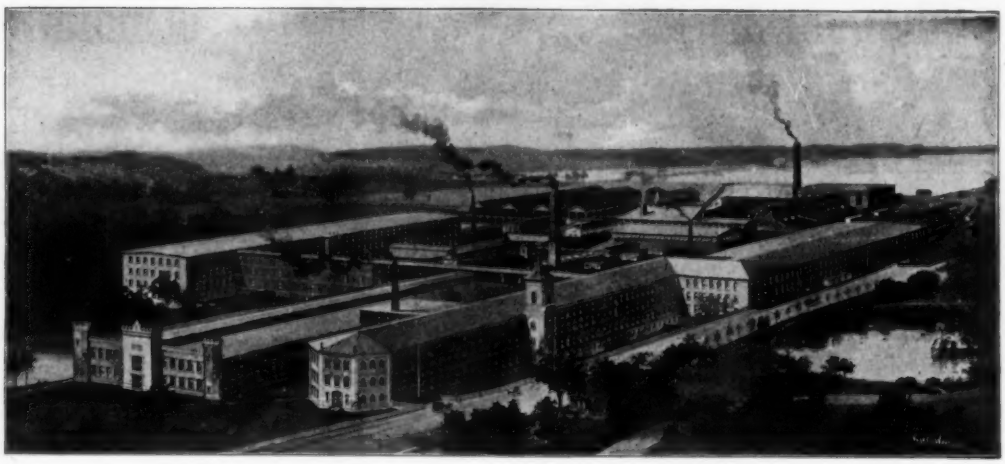

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Trust Building, CHARLOTTE, S. C.
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Revolving Flat Carding Engines,
Sliver Lap Machines,
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Railway Heads,
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Spinning Frames,
Spoolers,
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Reels,
Looms,
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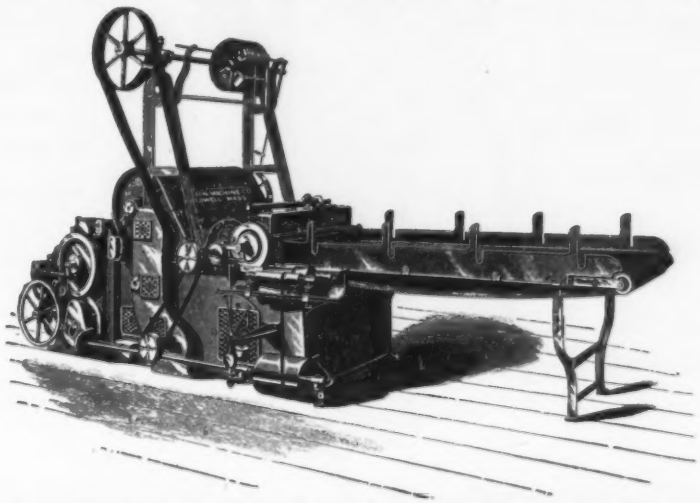
The Best Pickers

In the Cotton Field nothing equals the DARKY COTTON PICKERS.



In the Cotton Mill nothing equals the KITSON COTTON PICKERS.

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LARGEST BUILDERS OF COTTON OPENERS AND LAPPERS IN THE WORLD.

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BUILDERS OF

RIB KNITTING MACHINERY

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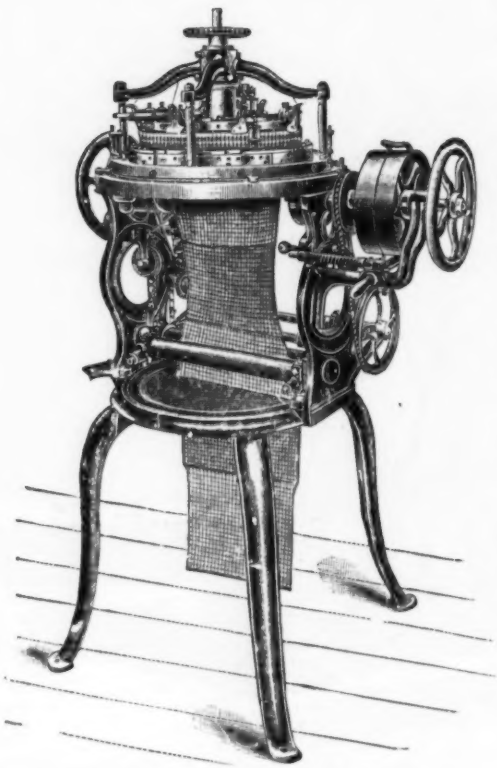
The illustration shows our

Improved High Speed Single Lever Automatic Ribbed Underwear Machine

for making ladies' and gents' ribbed underwear, union suits, etc., plain and shaped.



Plain, Single Lever, or with Welt, Slack Course and Automatic Slackening Device for Welt.

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Sizes, 8 to 24 inches, inclusive, varying by one inch.

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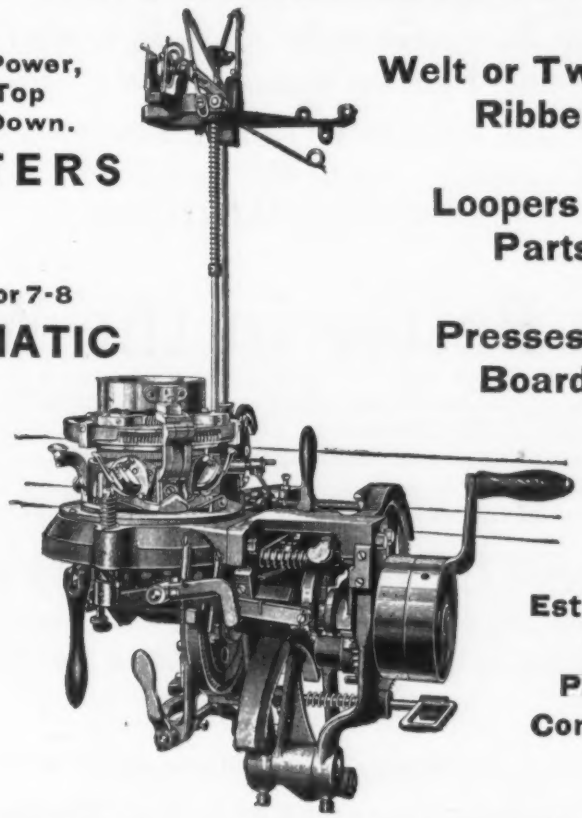

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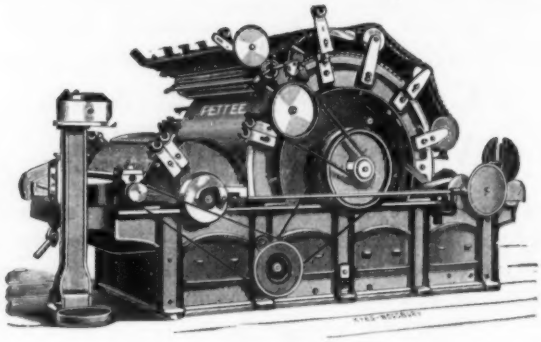

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HIGH COTTON

NECESSITATES CAREFUL MANAGEMENT

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REDUCES COST OF SPOOLING.

78%

Of the Cotton Mills of the United States are Equipped

ARE YOU?

BARBER & COLMAN

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THE OLD WAY.

Oiling stock with a tin can with holes punched in the bottom, or a watering pot. Wasteful of oil and labor and seldom done twice alike, but is still used in some mills.

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THE MODERN WAY.

Oiling and dampening stock with the Spencer Automatic Oiler applied to feed table of wool picker, lumper or lapper. Batches treated as desired. Perfect regulation.

Not much need to dwell upon the advantages of the automatic system, by which uniform results are obtained with saving of oil and labor, as compared with the sloppy, guess work, waterpot system.

It's the story of the Bramwell and Apperly feeders over again. How many mills are feeding by hand to-day? There will be very few oiling by hand in a few years. Hundreds of the best mills are using the Spencer Oiler to-day. Are you? If not, send for particulars.

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New and Improved Looms,

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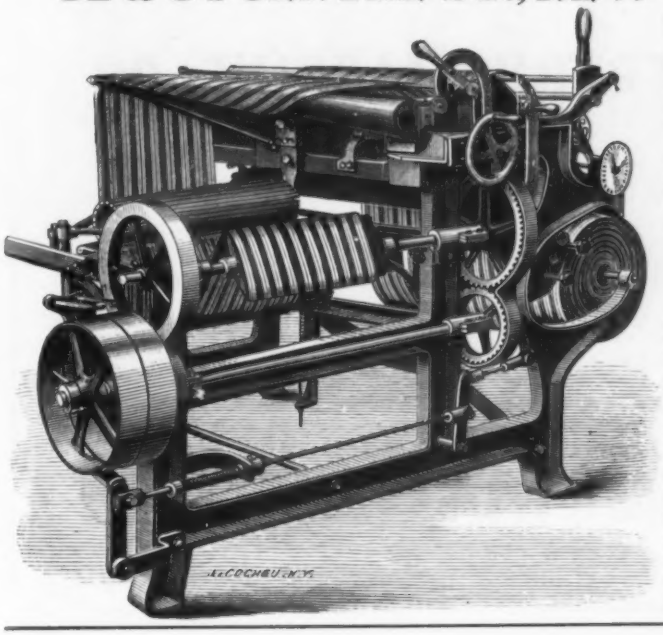

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On Cottons, Woolens and Carpets.

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and imprint the measurement upon fabrics, fold lengthwise and roll into merchantable packages all in one operation.

Prevents claims for short measure.
Marks piece numbers on each package.

A Fully Equipped Machine Shop for General Work.

HOUGHTON'S
ALL STEEL THREAD BOARD

with Hardened Thread Guides.

7 1-2 CENTS PER SPINDLE.

PATENTED JULY 9, 1901.
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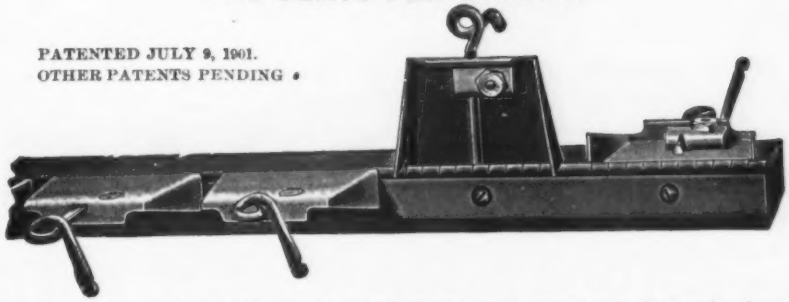

The only Thread Board that *holds a guide solid* all the time; *never* gets loose; is always in perfect adjustment, and thus must make a saving in travelers, broken ends, waste, thread guide, care and also prolong the wear of rings and increase the production per spindle. These claims are based on the truth of mechanical principles, and have been proven true by actual use in many mills whose superintendents will substantiate these claims.

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LOOMS

For Silk or Cotton; Automatic Filling Changing Mechanisms,

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DRYERS AND FANS

For WOOL,
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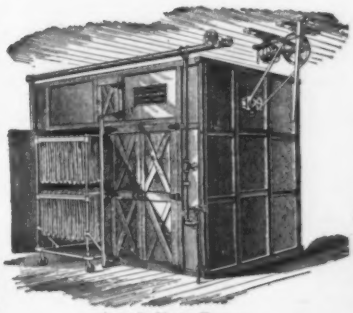
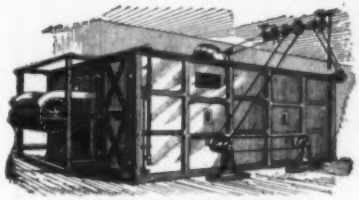
YARN, STOCKINGS,
UNDERWEAR,
Etc.



Truck Yarn Dryer.

Write for Booklets.



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Outfits for Wool

Noils, Rags and Cloth.

"Hurricane" Fan, Style No. 2.

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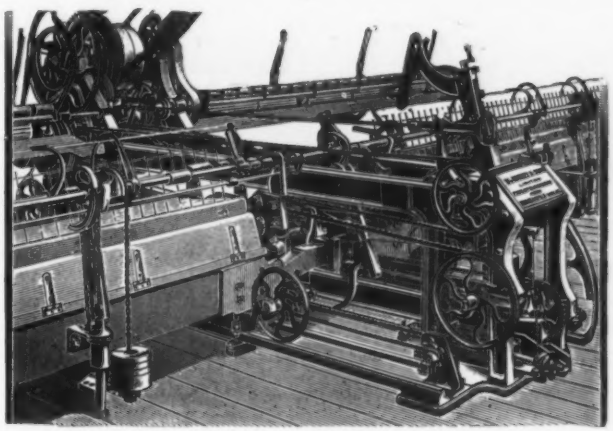

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Moore & Whiteley's Patent Wool and Cotton Dryer.

Crabbing or Winding-on Frames.

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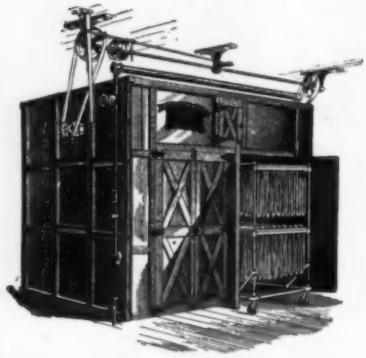
FOR WOOL, COTTON, STOCK, YARNS, HOSIERY AND UNDERWEAR.



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Carbonizing Plants Complete;
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Automatic Spinning Frames, Improved Laying Machines; and other Special Machinery for the Manufacture of Rope Yarns.

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The oil you are throwing away may be used again and again, after it has been cleaned and filtered through a

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It cuts down the oil bills from 50 to 75 per cent. because it makes your oil go two or three times as far as before. Let us put in a Filter for you to try 30 days. When it proves to your satisfaction that it will save half the money you pay for oil, send us the money. If not, return the Filter at our expense. Will you write for it today?
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SUPPLIED ALSO BY OIL COMPANIES, ENGINE BUILDERS AND POWER CONTRACTORS.

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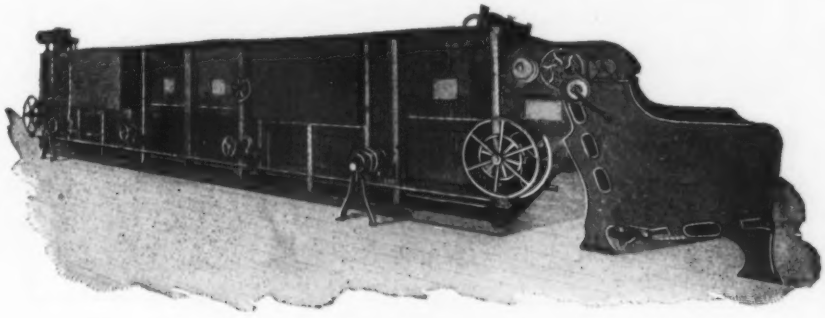

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Stock Dryers, Wool Washers,
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Horizontal or Vertical Drying Machines with Copper or Tinned Iron Cylinders.

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Single and Double Cylinder Engines

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French Napping Machines
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Chilled Iron, Brass, Copper, Wood, and Rubber Rolls for all purposes,

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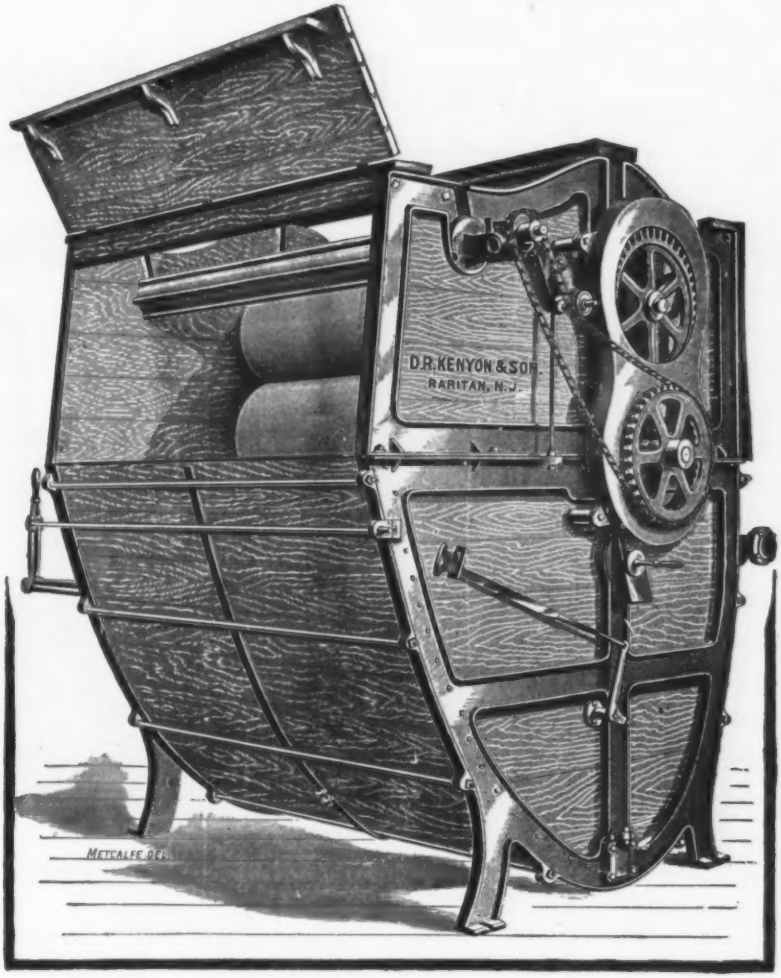
Estimates, Drawings and Full Particulars of Complete Plants Furnished on Application

SOMERVILLE, MASS.

Kenyon's Improved Cloth Washer

FOR FOUR, SIX OR EIGHT STRINGS OF GOODS



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Improved trough and valves, preventing wash of liquor and insuring quick and thorough scouring and rinsing.

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WATER WHEELS,
Horizontal and Vertical.
Iron Flumes.
Rotary Fire Pumps.
Centrifugal Pumps.
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Rotary Fulling Mills.
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Endless Felt Washers.
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Crank Knit Goods Washers.
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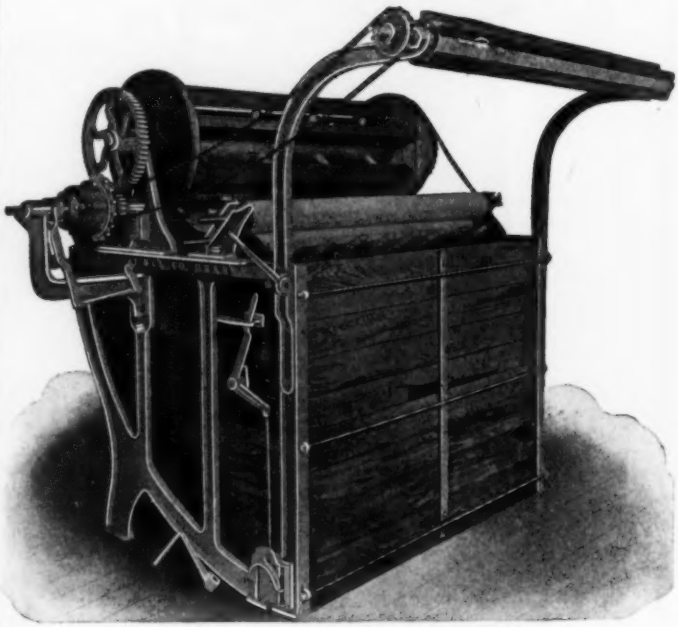
Soaping Machines.
Cloth Winders.

New Dyeing Machine



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TYPE M. FOR BLEACHING COTTON KNIT GOODS, CIRCULAR No. 16.

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70 KILBY STREET,
Telephone No. 1522.

Main Office and Works,
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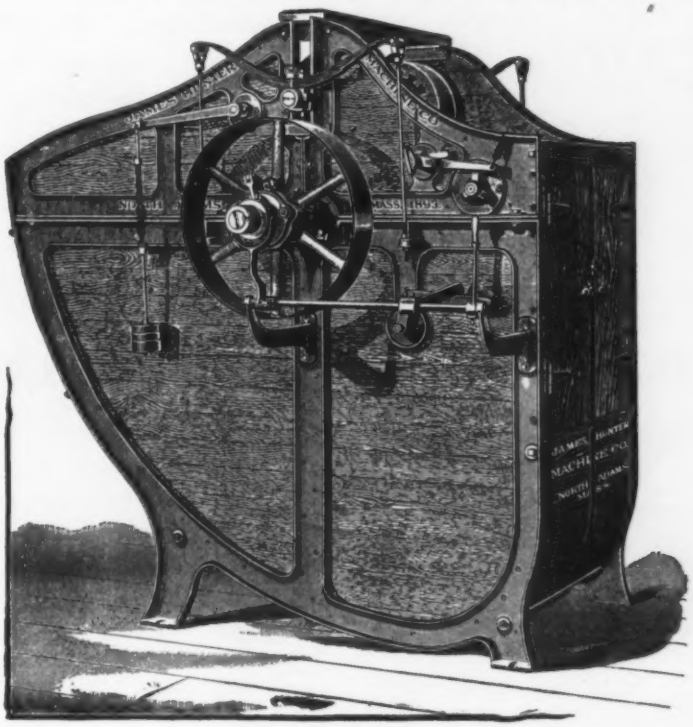
Automatic Wool Washers

PARALLEL RAKE

The "STONE DRYER," for Wool, Cotton, Rags, Etc.

CARBONIZING MACHINERY, ETC.



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WOOL OPENERS, SELF FEEDS, DUSTERS

JAMES HUNTER MACHINE COMPANY, NORTH ADAMS, MASS.

YOU WANT THE BEST. WE BUILD THEM.

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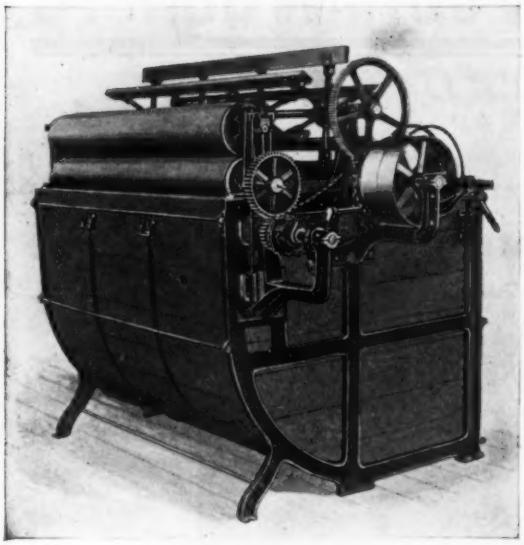

1903 PIECE DYEING MACHINE.

FULLING MILLS

Piece Dyeing Machines,
Dye Tubs, Vats,
Tanks, etc.

HOPKINS MACHINE WORKS

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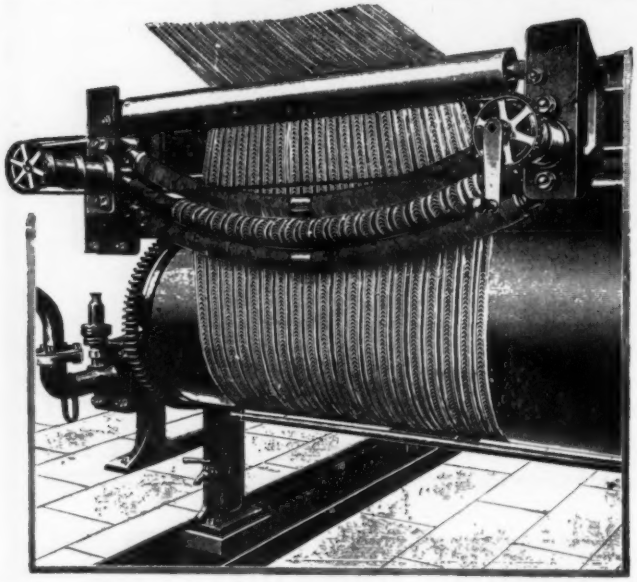
Our machines are up to date.
Patented features found in no others.
Most effective and economical machines built.

Send for Catalog, Prices, and also ask about our fulling mill for extra heavy goods and blankets.

A PERFECT CLOTH EXPANDER



The recent invention of Wm. Mycock, an English cotton manufacturer. Hundreds sold in Great Britian and on the Continent. Large bleacheries in this country where it has been placed on trial are delighted with it. Gets the full width of goods, with perfectly even tension both ways. Can be attached to calenders or cans. Put it on trial.

Patented in United States, Canada, Great Britain and Continental countries. Infringements will be prosecuted.

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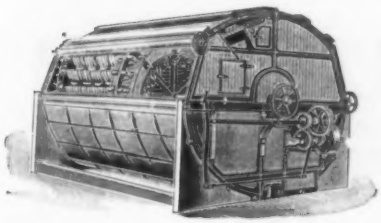
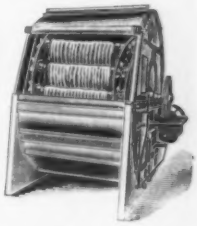


SAVES
75 per cent in Labor,
30 per cent in Winding,
Steam and Dye Stuffs,
Perfectly Even Dyeing.

CAPACITY:
50 to 700 pounds per batch.



No Friction on the Skeins. No Tangling of the Yarn.

Universally Used.

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BUILDERS OF MACHINERY FOR DYEING, BLEACHING AND MERCERIZING.

For Skein — Worsted, Slubbing, Cotton and Silk.
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" Skein and Warp Mercerizing.

RAW WOOL AND COTTON MACHINES.

SAVES
50 per cent in Labor,
besides Steam and Dye Stuffs.
Practically Indestructible.

CAPACITY:
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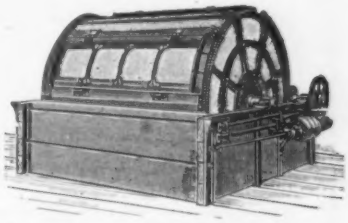

Leaves Stock in Perfect Condition. Does Not Mat or Tangle the Fibre.

A Perfect Machine.

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Builders of Textile Machinery

FILLING COP WINDING MACHINES. Spindles driven by belts or by gears, and bobbins can be made to wind any kind of filling from the coarsest to finest numbers, from Skeins, Spools, Cones, Mule Cops, or any other Spinning or Twister Bobbins. These machines can be arranged to wind cops or butts from the largest used in weaving to the smallest cops or butts for cotton filling used in the silk trade.

OUR MACHINERY PUTS YARN IN CONDITION FOR MANUFACTURING AS SHOWN ABOVE.

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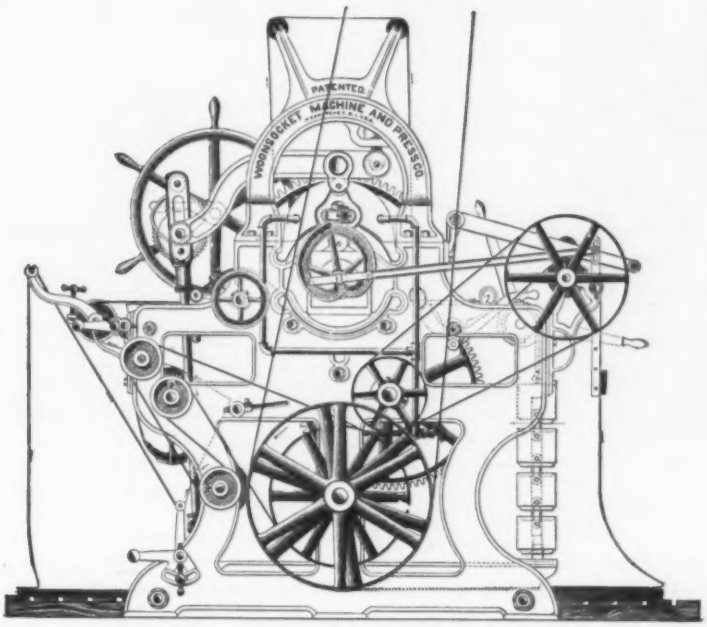
Four Separate Pressings In One Machine!

The Only Press that has Self-Yielding Beds with Four Points of Contact

PERFECT TEMPERATURE, POWERFUL, SIMPLE



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Woonsocket Machine and Press Company

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Manufacturers of the best types of

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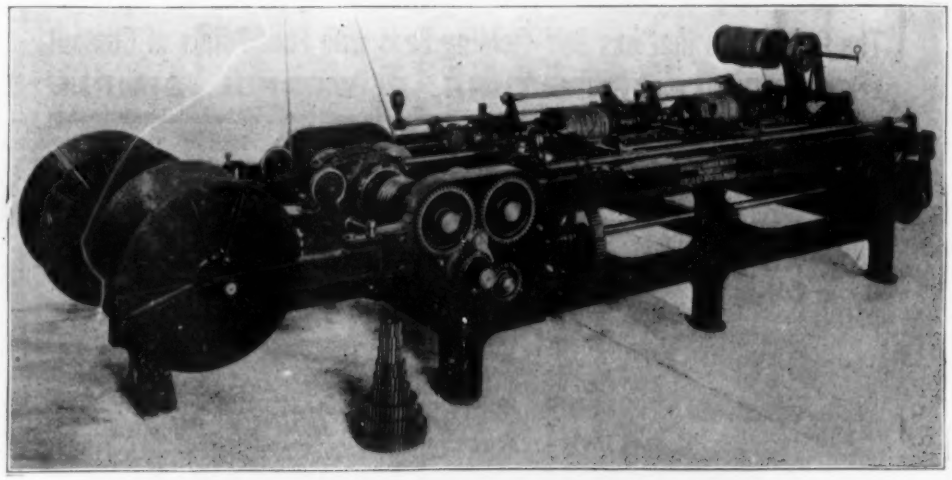
Which are adapted for making all kinds of

COTTON CABLE-LAID TWINE, CORD and ROPE



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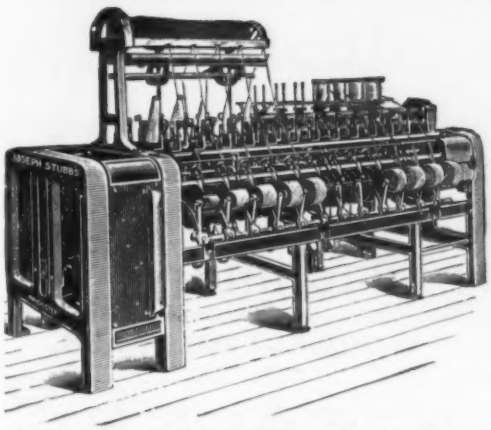

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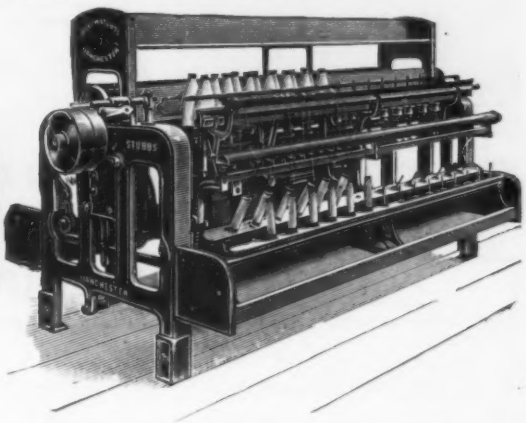

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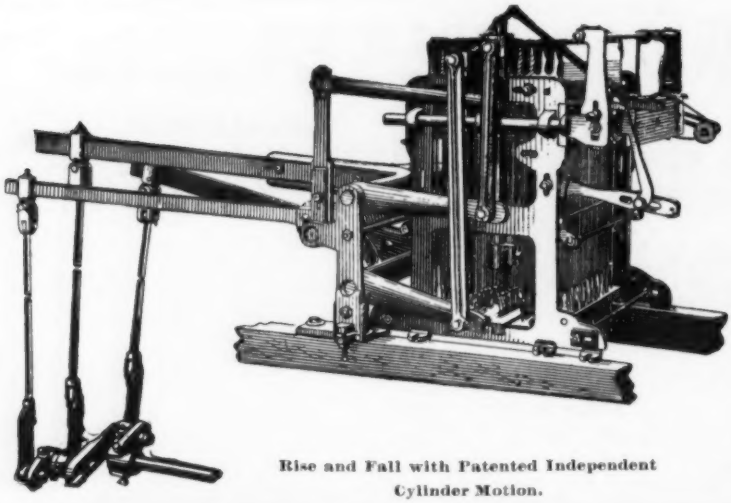

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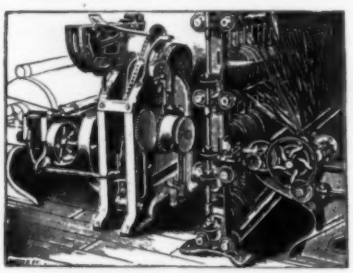

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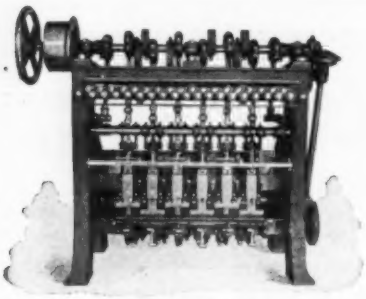

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Thus keeping a larger heating surface, as well as meeting sudden demands for power, the

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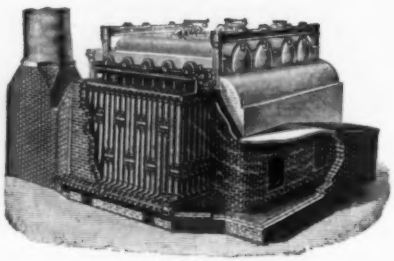

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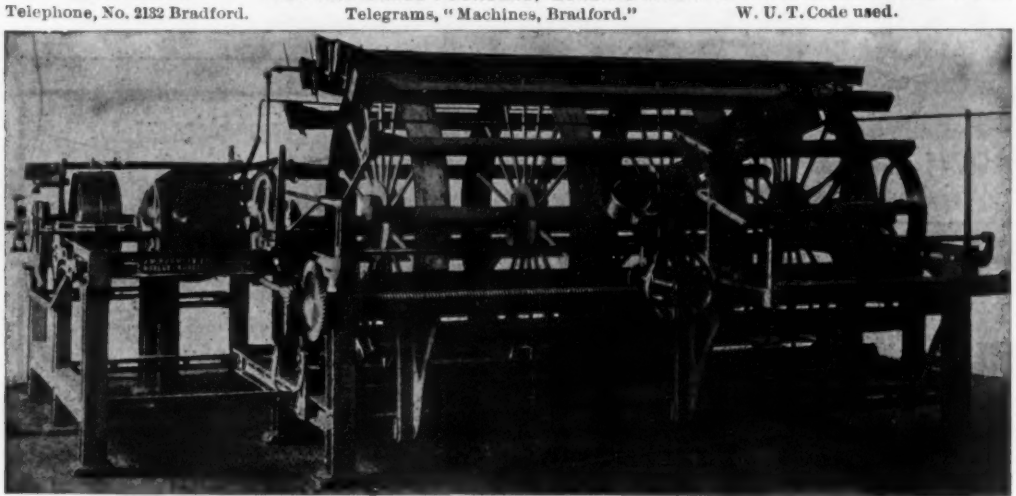

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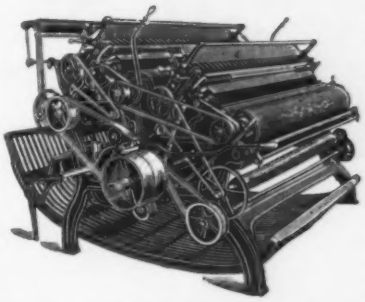
DOUBLE SHEAR



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Mill Sewing Machines

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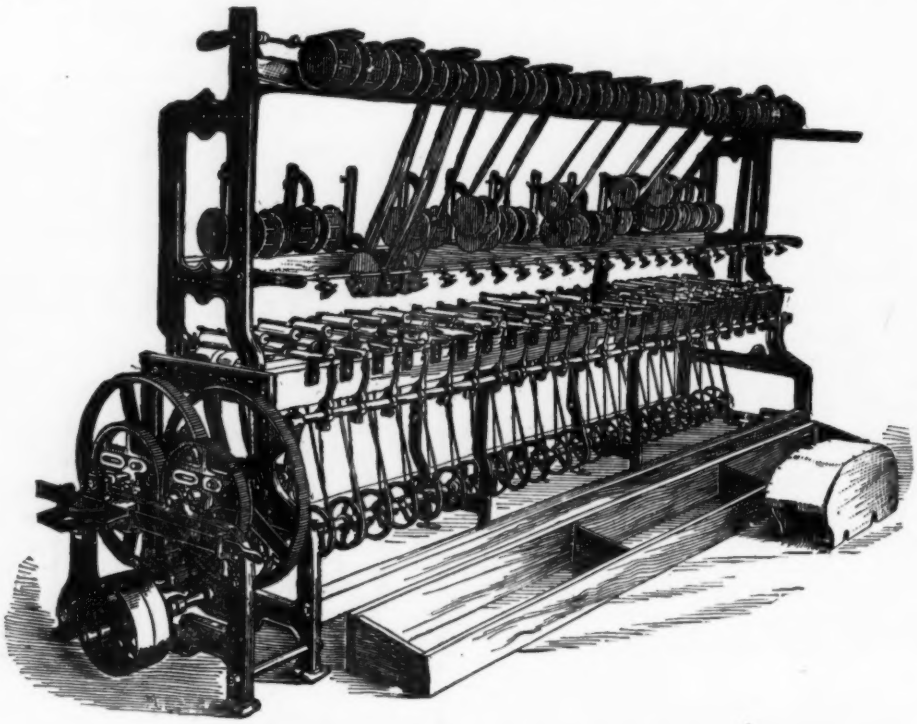
Patent Skein Winder

FOR SHUTTLE BOBBINS, WITH VARIABLE MOTION



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They Spin Better and Take Much Less Power to Drive than any of the other Spinning Frames in use

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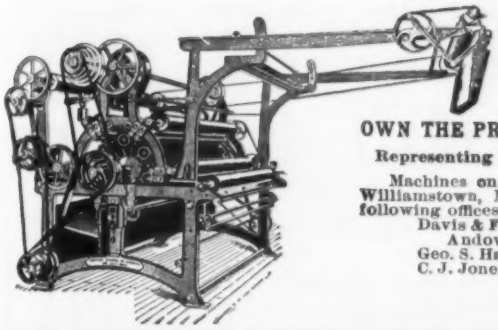
Correspondence respectfully solicited.



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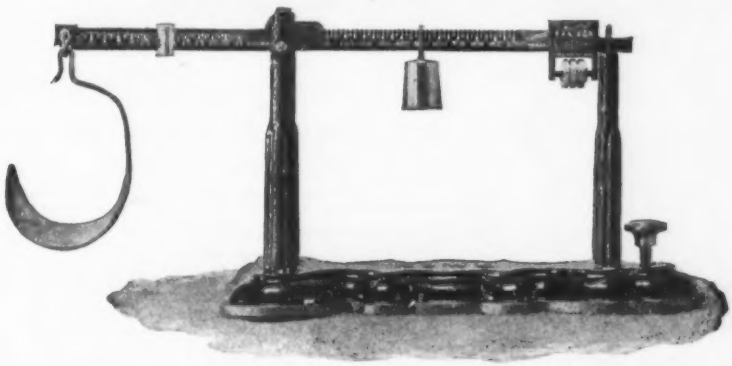

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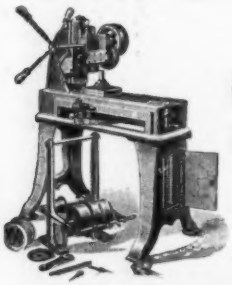

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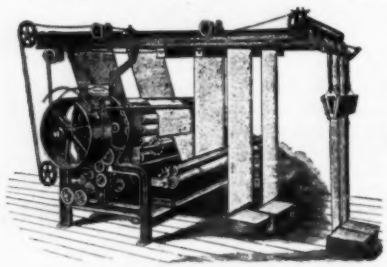

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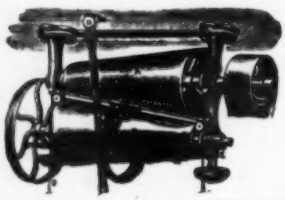

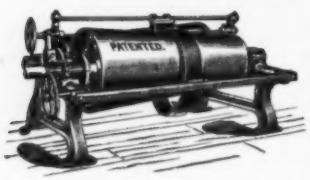

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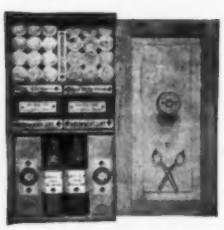

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CONTENTS.

6 rolls linten bandages	2 in.	2 packages absorbent lint.	
6 " " "	2 1-2 "	2 " " cotton, 1-4 lb.	
3 " cotton "	1 1-2 "	1 12 oz. bottle carron oil.	
3 " " "	2 "	1 12 " " arnica.	
3 " " "	2 1-2 "	1 roll adhesive plaster.	
3 " " "	3 "	1 package iodoform gauze.	
2 packages first aid for wounds.		1 pair scissors.	
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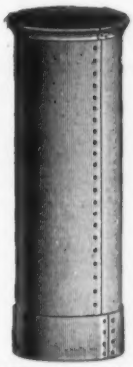

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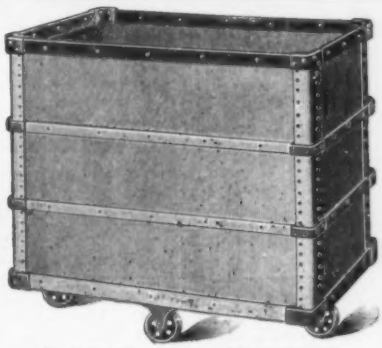

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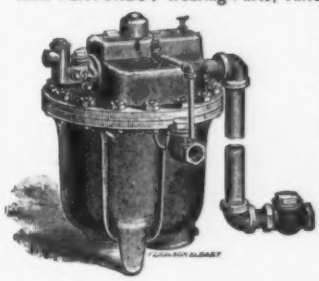

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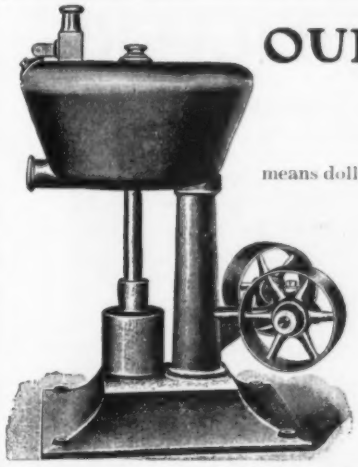

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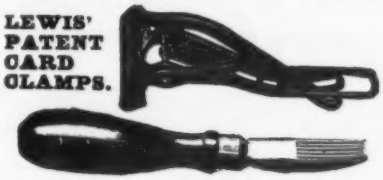

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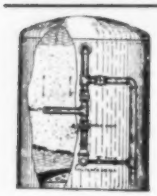

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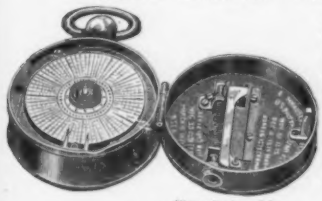

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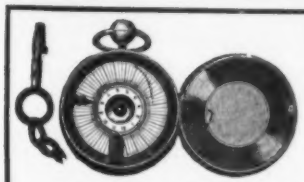

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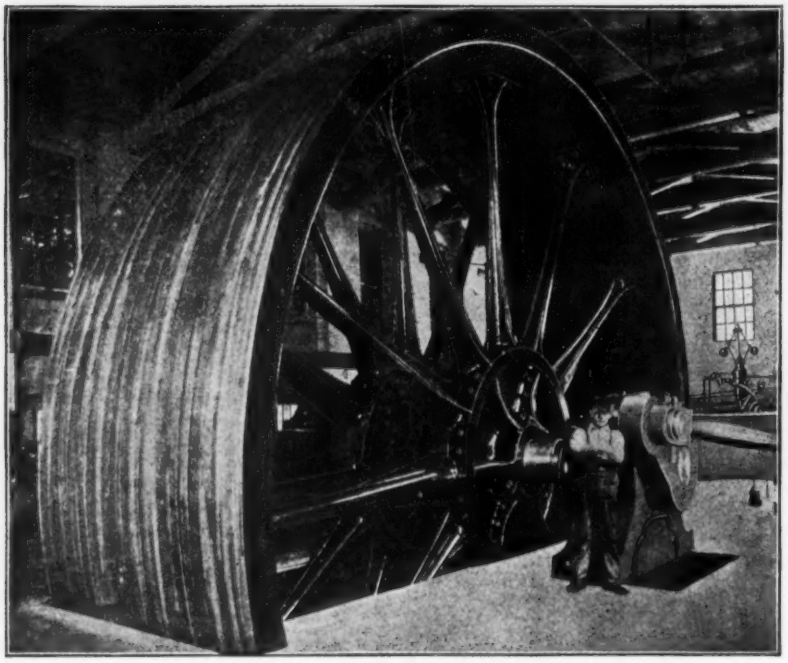
The Amoskeag Fly-Wheel.



ANNOUNCEMENT. It gives us pleasure to state that we have completed arrangements with the Amoskeag Manufacturing Company, of Manchester, N. H., in accordance with which we have taken over their wood-rim pulley department, including the fly-wheels as designed by Mr. Charles H. Manning, their Superintendent, and in this connection he has consented to act as our consulting engineer.

As to Construction.—In the construction of the fly-wheel shown in our illustration, width is 30 ft. diameter, the arms are so designed that each one will safely carry the belt-strain coming on its half of the wheel if the other eleven arms were entirely relieved, and the bolting of the hub is sufficient to carry its portion of the rim if cut adrift from the remainder of the rim.

The rim is built up in courses of thoroughly kiln-dried wood of from 3 to 4 inches in thickness. The butts in each course are left open ⅜ of an inch at the outer ends, and well-fitting hard-wood wedges are driven in on hot glue, with a heavy sledge, as are also the hard-wood keys between the outer ends of the the arms and the rim. Each piece in every course is thoroughly glued and secured in place with 8½-inch lag bolts.

As to Safety.—Compared with iron, the wood rim is ten times safer than the cast-iron *when* the castings are good. This allows the wood-rim pulley to increase its speed to 3.25 times that of a sound cast-iron one, with equal safety.

As to Weight.—A fact not generally known is that nearly all large cast-iron wheels which serve as balance wheels on steam engines are much heavier than is really necessary owing to the great difficulty of constructing such large wheels from light castings. Builders are obliged to make the segments very thick to insure good castings and to allow sufficient stock for finishing, and are generally sure to make all parts heavy enough to meet those ends, hence they get wheels that are too heavy.

A wood-rim wheel, constructed in the manner shown in our illustration, is heavy enough for regulation, and yet many times stronger than an all-iron wheel.

We invite your attention to the consideration of this method of construction when accidents, contemplated changes, or other reasons interest you, and we will be pleased to give further information on request.

CHASE PULLEY COMPANY,

201 Pitman Street, PROVIDENCE. R. I.

As Manufacturing Engineers

OUR MISSION ON EARTH
IS TO DESIGN, MANUFACTURE AND INSTALL

Complete Power Transmission Equipments

FOR THE FACTORY, MILL OR POWER HOUSE

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Our facilities are the largest in the world in this exclusive line of manufacture, with equipment thoroughly modern, thereby enabling the execution of orders to meet any requirement.

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An experience of twenty-three years has taught us how to secure the maximum from the minimum — that is, the maximum of effective power transmitted from the minimum of coal pile energy, a fact we shall be pleased to demonstrate.

We originated the "Independence" Wood Split Pulley, now universally used the world over. We were also the pioneer manufacturers and patentees of the "Dodge" American System of Manila Rope Transmission—acknowledged as the most economical and modern means of transmitting and distributing power. We have installed thousands of these drives.

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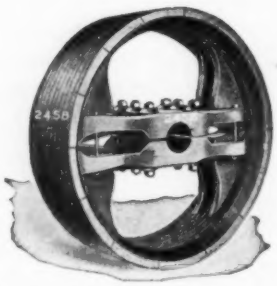

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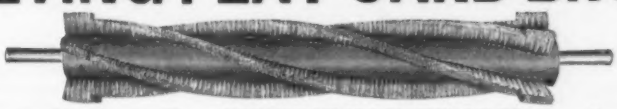

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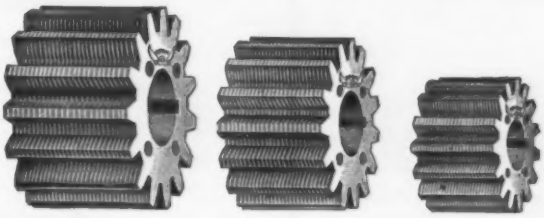

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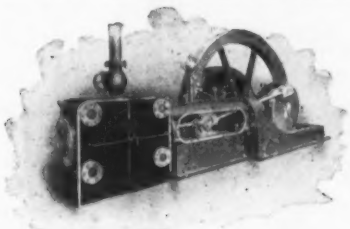

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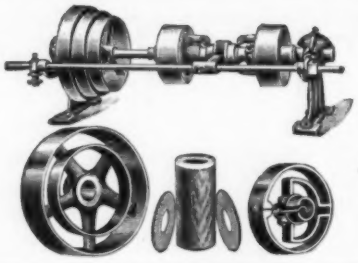

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Oil on your loose pulleys only makes trouble, and you're never done paying.

ARGUTO OILLESS BEARINGS stop the trouble once for all, stop the soaking of floors, belts and goods with oil, and stop the paying too.

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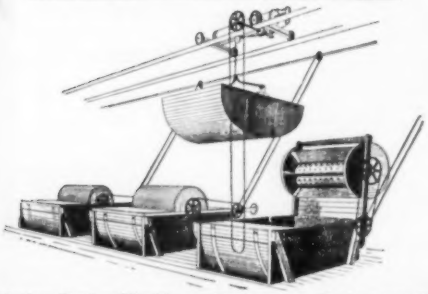

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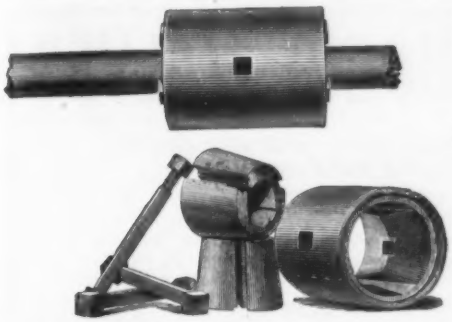

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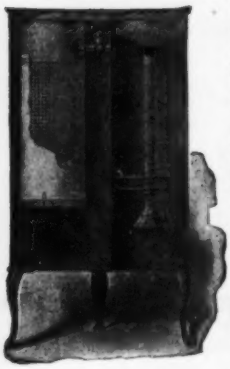

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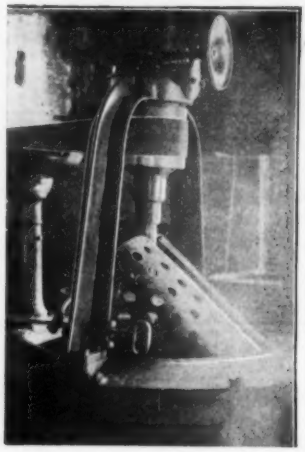

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FREE PASSAGE OF AIR.

Can be applied to your extractor by your own machinist.

Will absolutely prevent any person wilfully or accidentally coming in contact with a machine while in operation. Send for circular.

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The best skilled English workmen employed on both our flyer and presser work. Write for prices and discounts. Steel Rolls renecked. *Don't throw away your old flyers. Send them to us and we will save you money.*

We Braze on Nibs.

We Repair the Ends.

Light Weight Baskets

are needed about a mill. We meet this need with our DUCK BASKET with *Steel Frame*—a very light and strong combination. Try them. Samples on approval. Booklet.

Morris & Co.

Groveville Mills. YARDVILLE, N. J.

FRANK BAILEY,

BUILDER OF

YARN DRYING MACHINERY

ON THE

COLD AIR SYSTEM. Simple, effective, inexpensive. Leaves yarn in beautiful condition.

ALSO ON THE

HOT AIR SYSTEM when great capacity is wanted.

DYE STICKS, Kettle Sticks and dry and sulphur house Poles, also Sticks to suit the Wolstenholm Machine from natural water grown cedar, and Sticks to suit the Klauder-Weldon and Lorimer machines from finer grades of lumber. These Sticks have been thoroughly tested, and pronounced the best on the market. Guarantee satisfaction to buyers. Write for prices.

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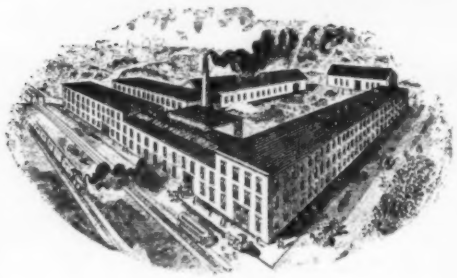

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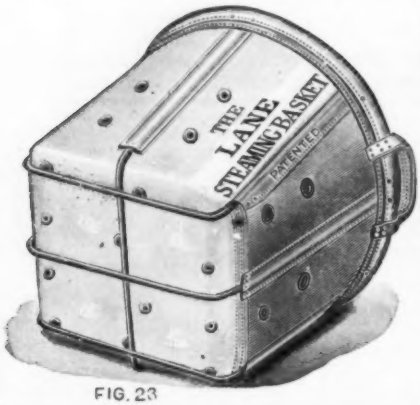

FIG. 23

The Lane Patent Steel Frame Canvas Steaming Basket.

MADE WITH OR WITHOUT WOODEN SHOES, AS REQUIRED.

Adapted to withstand the severe test of steaming better than any other basket, as it is constructed of such materials, and in such a manner as to be unaffected by steam, heat or moisture.

The steadily increasing demand for the Lane Patent Steaming Basket demonstrates the truth of our claims.

W. T. LANE & BROTHER,

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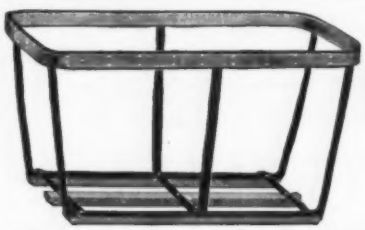
Formerly located at Port Chester, N. Y. Poughkeepsie, N. Y.



IT IS EASY TO SEE THAT

CANVAS BASKETS

WITH A FRAME OF

FLAT TEMPERED SPRING STEEL and a RIM of

ROCK ELM

securely riveted at every joint and point of intersection *must be* ABSOLUTELY RIGID, for you cannot bend a flat piece of steel edgewise. Wooden shoes protect the bottom. Handles cut under the rim or made of canvas as preferred. Smooth inside and easy to handle. The IDEAL basket. No other so strong. "BALLOU BASKETS ARE THE BEST" whether of CANVAS or POUNDED ASH which has a national reputation, and are used extensively by the Government.

Write for our Booklet.

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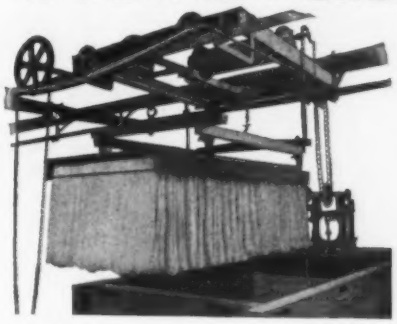
The New Hussong Dyeing Machine

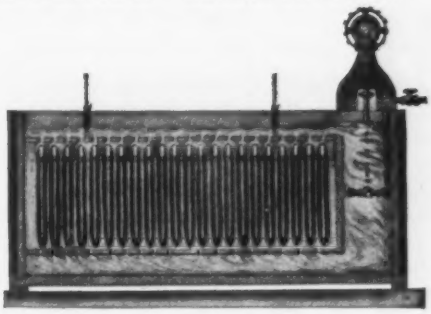
Patented Nov. 6, 1900. April 9, 1901.

For Dyeing both Alizarine and Acid Colors on Yarn.

A PERFECT SKEIN DYEING MACHINE.



STYLE A. Showing 300 pound Yarn Machine, with removable dye-sticks.



Longitudinal Sectional View, showing the circulation of dye-liquor through the yarn when in operation.

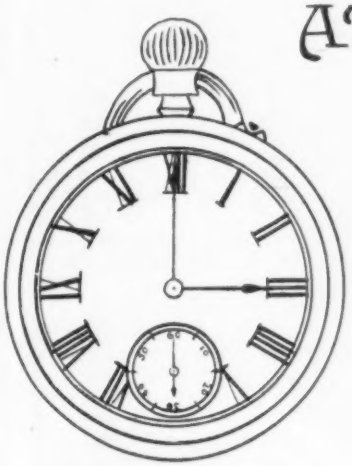
Points of Superiority Which We Claim for the Hussong Machine.

Durability, Even Dyeing, Saving of Steam, Saving of Dyestuff,
Saving of 75% in Labor, Makes No Waste Whatever, No Friction on the Material,
Requires but Little Power to Operate,
Leaves the Yarn and Slubbing in its Natural Condition.

Built by the **AMERICAN DYEING MACHINE COMPANY**, Office 609 Pearl St., Camden, N. J.

Reference Given on Application.

Deliveries always on Time



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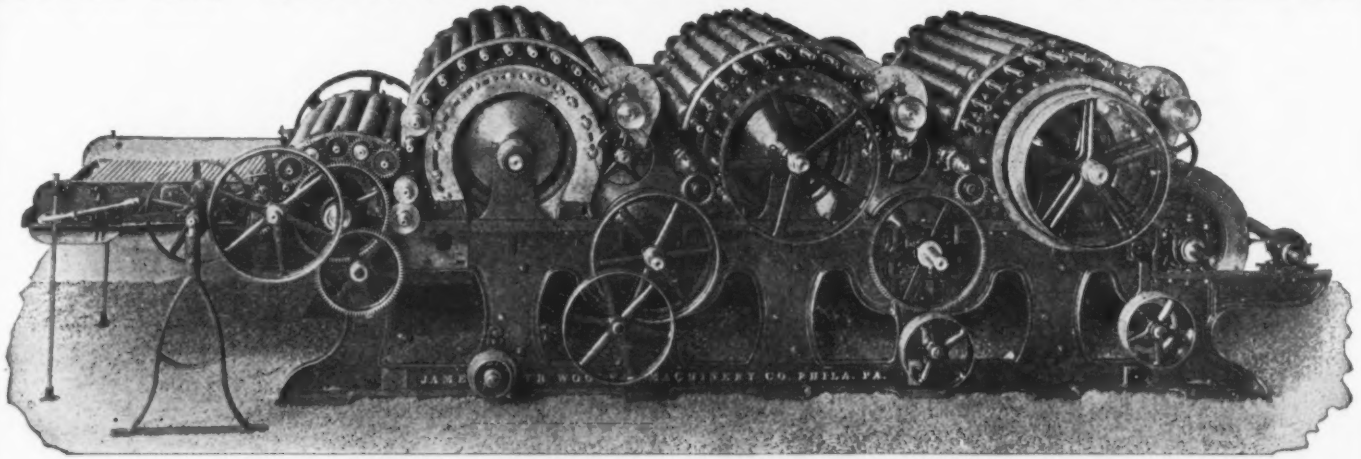

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There are 22 textile maps; gives population of town and railroad connections.

PART II. Is the Yarn Trade Index, containing classified lists of yarn spinners, arranged according to kind of yarn, size and number spun, etc. All the mills with worsted machinery are included in this section.

PART III. Contains Classified List of mills doing order and commission work, also dyeing, finishing, bleaching and printing establishments, classified according to the kind of work done, and so far as possible giving width of goods handled; also shoddy, extract and flock manufacturers and wool scouring establishments.

PART IV. Manufacturer's Selling Agents and Dry Goods Commission Merchants, giving the name and address of concern, character of goods handled, different departments, with managers, list of manufacturing clothiers, and suit and cloak manufacturers, giving specialties and buyers names. A list of city offices of textile mills is given.

PART V. Dealers and Brokers in raw materials and stock, including wool and shoddy dealers and brokers, cotton dealers and brokers, factors and buyers and wholesale rag dealers making a speciality of textile interests.

PART VI. Buyers Index of Textile Machinery and Supplies, and statistics showing textile machinery in the United States, giving spindles, looms, knitting machines, etc.

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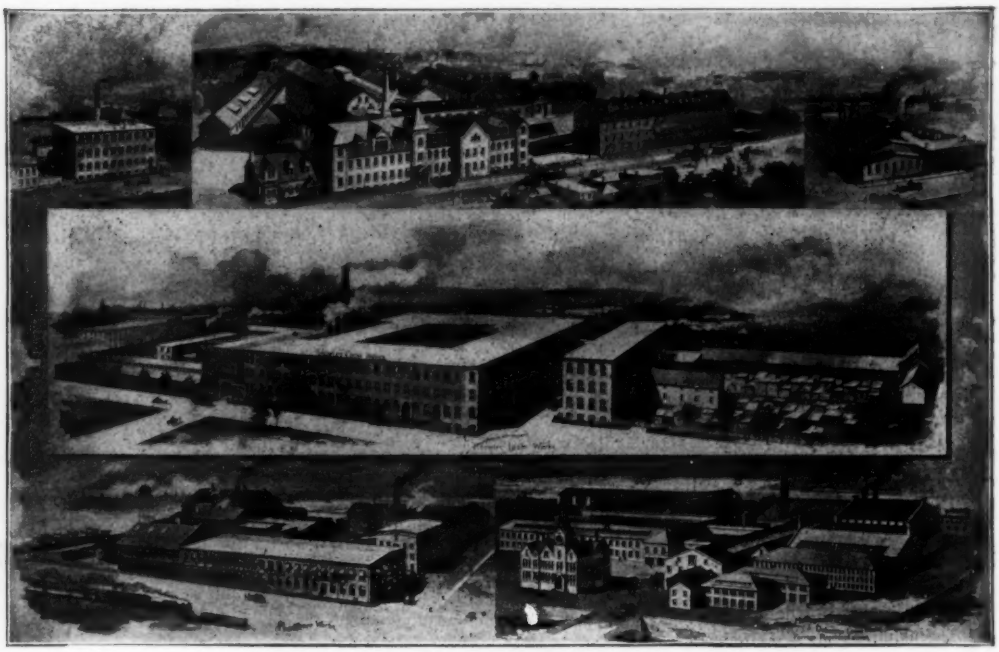

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The Textile World and Textile Record.

VOL. 25. (NEW SERIES.) JULY, 1903 No. 4.

Monthly Comment.

Flood and Hurricane.

Last month the Southern and Western states were visited with unusually disastrous floods and hurricanes, which caused large loss of life and destruction of property, and in which the textile industry was an especial sufferer.

A cloudburst in Spartanburg between midnight and daybreak of June 6th caused great loss of life and damage to property along the line of the Pacolet and Tyger rivers. Clifton and Pacolet were the scenes of the greatest loss of life and destruction of property. The flood came without warning in the early morning and first struck the mill town of Clifton, where the mills of the Clifton Manufacturing Company are located. The Converse mill was carried away, and the Dexter and Clifton mills seriously damaged. Warning was sent to the towns along the valley, and when the flood reached Pacolet the operatives had left the mills and were on high ground waiting for its coming. The water came rushing down the valley in the form of a solid wall over thirty feet high. In a short time only the foundations of mills Nos. 1 and 2 remained. The No. 3 mill of this company was damaged seriously, but not destroyed. The Pacolet Manufacturing Company, owners of the three mills at Pacolet, also own the Gainesville, Ga., cotton mills, which were partially demolished by a hurricane with a loss of over thirty lives the week before the flood that carried away their two mills at Pacolet.

About fifty lives were lost in the flood along the valley and the damage to property is estimated at $4,000,000. Over six thousand operatives have been thrown out of work, and the suffering among the people who depended upon the mill for support, though serious, would have been much worse had it not been for the prompt and generous assistance which came from both neighboring and distant sections of the country. As soon as the flood had subsided work was begun repairing the damaged mills and getting them in shape to resume operations.

A like catastrophe, but of greater extent, occurred at Heppner, Oregon, on Sunday, June 14th. A cloudburst in the mountains sent down the valley a vast body of water which wiped the residential portion of Heppner out of existence. Here the flood came so quickly that the people could not escape. About three hundred of the twelve hundred and fifty inhabitants of the place were lost.

Heppner is an important wool centre, and the week before the disaster many Eastern wool buyers were at the place and made extensive purchases of wool, of which a large

part was lost in the flood. Fortunately the sales closed before the flood, otherwise the long and harrowing list of the lost would undoubtedly have been swelled by the names of many members of the wool trade.

Woolen Goods at the St. Louis Exposition

The National Association of Wool Manufacturers has sent out a circular letter to woolen manufacturers asking that notice be sent to W. J. Battison, Sec., 683 Atlantic Ave., Boston, by those intending to make an exhibit of woolen products at the St. Louis Exposition. There is no cost connected with the exhibition space. There were but 101 exhibitors of woolen goods at the Centennial Exposition in 1876 and the number was increased to only 104 at Chicago in 1893. The committee consisting of William Greene, Peace Dale, R. I., Louis B. Goodall, Sanford, Me., John P. Wood, Philadelphia, Pa., Franklin W. Hobbs, Lawrence, Mass., Henry P. Fairbanks, New York City, urge manufacturers throughout the country to give the matter their earnest attention and if possible arrange to exhibit their products at St. Louis, so that the display may be worthy of the great woolen industry of this country. Necessary blanks and any other information will be supplied upon application to Mr. Battison or any of the committee.

A Metric Echo.

The American Society of Mechanical Engineers authorized last year a mail discussion and vote by its members upon the metric question. This action followed the reading of the paper by F. A. Halsey against the system. One of the questions related to the proposition to compel the use of the French system in Government work, as provided by the House bill of last year, upon this issue the vote of the society was as follows:

	For	Against
Business Men	30	163
College Professors	15	27
Draftsmen	5	9
Railroad Men	0	14
Mechanical Engineers	25	82
Junior Members	20	46
	95	341

Shoddy.

The recklessness with which people denounce shoddy and charge domestic textile manufacturers with fraudulent practices in manufacturing and selling their products never received a better illustration than last month. Dispatches from Washington stated that Governor Taft had cabled from Manila to Secretary of War Root asking for experts to be sent from this country to the Philippines to inspect the cleaning of hemp, and assist in carrying out measures to prevent the Filipinos from ruining the Manila hemp industry by sending improperly cleaned hemp to market. It was shown in our June issue that the trouble is caused entirely by the use of notched knives in cleaning hemp by the Filipinos; that the only persons benefited are the Filipinos themselves, and even with them the benefit, consisting of a lightening of their labors, is at best but temporary, sure to result in the ruin of the high reputation that Manila hemp now has, and consequently in the ruin of the industry itself; that the trouble has not been stopped is simply because the American authorities in the Philippines could not see their way to apply the arbitrary and drastic remedies that were in vogue under Spanish rule and which consisted in seizing and destroying private property in the form of improperly cleaned hemp.

The newspaper writers either ignored these facts or did not take the time to learn them. Instead they jumped to the conclusion that here was proof of the American propensity to adulterate textile materials with shoddy. They shed crocodile tears over the ruin American misrule was bringing upon the Filipinos and the Philippine hemp industry, one editor expressing his grief and despair in these words under the caption, "Shoddy Hemp:"

> It is a wretched commentary on modern business methods that greed should so soon threaten an industry which grew to world proportions under a regime which we have been wont to describe as lacking in all the elements of moral and commercial pulchritude.

While this extract was being written the Filipino hemp cleaners, with an appalling "lack of moral and commercial pulchritude,"

were industriously nicking the edges of their hemp knives and sending down from the hills of Manila vast quantities of badly cleaned hemp, unconscious that the blame was being laid in American newspaper offices upon the Americans, who were thus forced not only to buy this hemp or go without, but also to bear the blame for producing the rotten stuff.

British Free Trade.

For years the most effective argument against any change of the American tariff in the direction of free trade has been the cry of the pauper or cheap labor of Europe. English as well as Continental labor was included in the classification. The recent proposal in the British House of Commons to establish a general policy of protection throughout the empire has caused the same cry of pauper labor to be raised in England. This appeal has been made in America in defence of a protective tariff. In England it is used in defence of free trade. One English journal, Commercial Intelligence, publishes some interesting statistics as to labor on the Continent, which may be profitably studied on this side of the Atlantic. These figures, taken from an official report on labor conditions in Germany, show that the wages of day laborers vary from 38 1/2 cents a day in Posen to 67 cents in Essen and 72 cents in Leipsic and Hamburg. The wages paid by the Prussian State Railways are as follows:

Workshop foremen	$1.00 per day
Car examiners	.77 per day
Mechanics	.60 per day
Ticket collectors	.57 per day
Signalmen	.56 per day

The English journal points to these starvation rates and asks how any one can have the hardihood to ask the well paid English workman to reduce his wages to the Continental level by adopting Continental tariffs in England. Meanwhile the American workman can consider both English and Continental wages and ask why he should bring himself to either level by lowering the tariff.

In 1895 there were 456 fur establishments in this country, of which 251 were in New York.

Cost of Knit Goods.

A knowledge of the cost of the finished product is of vital importance in the knit goods as in every other industry. This knowledge can be obtained only by keeping an accurate and systematic record of the production and cost in each department. To afford a reliable basis for calculating cost such records should cover a period of six months or a year. In this way the ordinary fluctuations of production and cost are equalized and an average obtained for estimating the cost of the goods. In another part of this issue will be found an article on this subject written by a practical knitter which will be of great value, especially to those knitters who are employing rule of thumb methods or none at all. It is by no means difficult to find knitting and weaving mills in which there is an almost complete lack of method in estimating cost and fixing selling prices. Many manufacturers are guided in these matters by the fabrics and prices of their competitors, and argue that if this one or that one can afford to sell such a fabric at such a price, then he can also sell it at the same price. The fallacy and danger of such a policy needs no proof. A knowledge of what the product costs which is offered for sale is just as essential to the manufacturer as to the merchant who buys it to sell again, and by means of a system suited to his own special requirements such knowledge can be obtained by the manufacturer to nearly that degree of accuracy which is attained by the merchant. One mistake that a manufacturer is apt to make is in thinking that a system can be found ready made to suit his requirements. This is far from the fact. There are probably no two mills to which exactly the same system is suited. The method must be adapted to a greater or less extent to each case. The general principles are the same for all, and these are very intelligently outlined in the article to which we have already referred.

Knitting by machinery has existed as an industry for upward of 300 years, and knitting by hand antedates the machine by nearly another century.

Silk Growing.

In many parts of the country, particularly in the South and West, much attention is being paid to the possibility of raising raw silk of which the imports into this country last year were valued at $46,734,489. The countries from which this silk came with the proportion from each were as follows:—

Japan	48.8 per cent.
Italy	24.3 per cent.
China	20.2 per cent.
France	4.8 per cent.
Others	1.9 per cent.

The experience of France in fostering silk raising is of interest in view of our own efforts to establish the industry in this country. The French government pays a bounty on all raw silk raised in France in order to encourage the production. In 1901 the amount paid on this account was $833,590. The inspection and management of the bounty system in the same period was $12,694, making a total cost of $846,284.

In spite of this substantial encouragement the industry is actually declining. In 1900 there were 257 filatures having 11,464 bassines, while in 1901 there were but 247 filatures with 11,250 bassines. It is the general opinion that this decline, taking place under a liberal bounty system, is due to the competition of the cheap labor of China and Japan. The labor cost of reeling is an important item in the cost of production and this gives the Chinese and Japanese filatures an important advantage over the higher priced labor in France. The wage level in the United States is considerably higher than in France while the operatives here are wholly unskilled.

If France with skilled help working for lower wages than obtain in the United States and with a liberal bounty system is unable to compete with China and Japan it would seem as if our chances in the same field were hardly worth discussing. This country consumes more raw silk than any other country in the world and imports all of it, and while the silk reelers in the far East are content to work for three to twenty cents a day, it would seem as if we might profitably continue such importations.

Imported Woolen Goods.

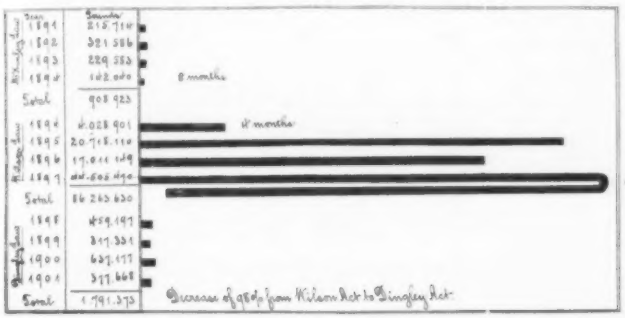
In an address delivered last month at the commencement exercises of the Philadelphia Textile School, Morris W. Benjamin attempted to give seven reasons why men's wear woolens are imported into this country. Briefly stated they are as follows:

1. Prejudice against American woolen goods.
2. Because imported goods are high priced.
3. Restriction of imported styles to certain buyers.
4. Greater originality and novelty of imported styles.
5. Superior colorings of imported, especially Scotch cloths.
6. Greater variety of imported fabrics.
7. Because the finest goods are made in England.

If the speaker had ended the list with reason No. 2, no exception could have been taken to his remarks. The last five reasons are, in fact, no reasons at all. No buyer of woolen goods, able and willing to pay the price, has any difficulty in finding American manufacturers to confine styles to him, and to any one acquainted with the facts concerning the manufacturing and commercial departments of the American woolen industry, the so-called reasons Nos. 5, 6 and 7 are convincing only as to the extent that reason No. 1 is operating on the speaker himself. The sole reason why men's wear woolen goods are imported in spite of our high tariff is the existence of a widespread prejudice against American and in favor of imported goods, particularly among a class of men whose ability to pay $75 or $100 for a suit of clothes is far in excess of their ability to judge of the merits of the fabric. This prejudice in favor of something foreign appears to be a human trait, for it is confined to no one country. Only a few weeks ago the French textile journals were protesting in vigorous terms against the general desire on the part of the French people to buy woolen goods in Belgium under the mistaken notion that they were getting superior fabrics. In this country, as in all others, what is known as fine goods form an insignificant fraction of all the

men's wear woolen goods consumed. If a very few desire to display their lack of knowledge of woolen fabrics and their wealth or credit at their tailors by buying woolen goods that are sold as imported, there can be no possible objection as long as the Dingley or some other bill enforces a tax on such transactions. We say sold as imported because in many cases domestic woolens are sold by the retailer as imported and the poor dupe of a buyer thinks he is clothing himself in "something English you know."

After giving his seven reasons Mr. Benjamin discloses his longing for the low priced free wool regime by referring to it as "an epoch of marvelous development in the manufacture of men's wear woolens in this country." So it was, but the development was mainly in the use of the cheapest of cheap wool substitutes, in the making of all wool goods containing no wool whatever. Our woolen manufacturers were simply overwhelmed with an avalanche of cheap and rotten foreign fabrics. In the struggle for existence during that "epoch" they learned not of the superiority of English colorings and styles, but of the superiority of English "mungo" and "mungo" fabrics. During that time shoddy was king. Our manufacturers could not find rags enough in this country to supply the demand, but were forced to import them in vast quantities. Our tables of exports and imports have repeatedly shown how the imports of rags and shoddy jumped from practically nothing under the McKinley bill to 50,000,000 lbs. in a single year. That flood of cheap stock has been illustrated in graphic form by Justice, Batemen & Co., of Philadelphia, publishers of the accompanying chart, to which we call the attention of all who may think that free wool does not mean free shoddy.



The result of Tariff Revision in 1894:—an increase of 9890% in the imports of shoddy under the Wilson Tariff Act.

Diagram showing imports of woolen rags, shoddy, waste, etc.

American Cotton in Austria.

The rise in the price of cotton has demoralized the Austrian cotton industry, not only on account of the extent, but also the suddenness of the change. Both spinner and weaver were forced to discontinue making contracts for future deliveries of the raw material and yarn owing to the inability to obtain advances on their goods. The foreign manufacturers find it much more difficult than do American spinners to meet such an increase in the price of raw material, owing to the fact that their goods are sold where the consumer has no surplus with which to pay higher prices. In America an increase in the cost of cotton as has recently occurred, is not only met by the consumer with comparative ease, but owing to our vast exports of the material actually increases the general prosperity and with it the purchasing power of the people. The European spinners have to choose between shutting down or running at a loss, for the prospect of selling their product at higher prices is too remote to warrant their basing contracts for the immediate future upon it.

Muslin is said to have taken its name from the Turkish city of Mosul, which has long been famous for the fineness and delicacy of its cotton textures.

Trade with Porto Rico.

The benefits to both countries resulting from a removal of the tariff restrictions on trade between Porto Rico and the United States are seen in the recent reports of the exports and imports of the island. For the 10 months ending with last April the exports from Porto Rico were at the rate of $14,355,277 per year. Of this amount 82 per cent. consisted of domestic merchandise and 2 per cent. of foreign goods shipped from the United States; 16 per cent. coming direct from foreign countries.

For the 10 months mentioned the domestic goods shipped from this country were valued at $9,844,318, of which 18 per cent. consisted of cotton goods, nearly all being in the form of cloth, of which there were 23,649,763 yds. This promising trade has grown up since the island came into our possession. In 1898, the year before the war, the total exports from this country to Porto Rico were valued at but $1,500,000. Today we are sending there cotton goods alone at the rate of more than $2,000,000 per year, while our total exports to the island are at the rate of nearly $1,200,000 per month.

Compared with these figures our trade with the Philippines makes but a poor showing. During the same ten months we exported to the islands $3,326,240 of goods, nearly all domestic, and received in return $10,796,893 of merchandise, of which $10,388,865, or over 96 per cent., was Manila hemp fibre. The small size of this export trade is due to the tariff levied on American as well as foreign goods coming into the Philippines. A repeal of these duties will doubtless lead to an expansion of our trade with the archipelago similar to that which has already taken place in the Porto Rican trade and which is but the beginning of what we may reasonably expect.

Combine of Tie Silk Manufacturers.

With the object of restricting certain abuses that have become a serious burden to the trade, a number of German manufacturers of silk scarfs and tie silks have formed a combine, or cartel, as it is termed in Germany, and have issued a statement of the mutual agreement, which they hope will prove a benefit to both manufacturer and buyer. Goods are to be sold on 6 months' time and discount allowed at the rate of 1 per cent. per month. Orders for fancy goods are to be accompanied in every case with definite date of delivery. Samples are to be paid for except in the case of new styles, of which 1/2 yard is to be delivered without charge. A sliding scale of annual rebates which increase with the amount of the year's purchases is arranged to induce the buyer to confine his business to the combine. This rebate amounts to 1/2 per cent. on 100,000 M., and increases to 2 per cent. on 400,000 M. If a customer's annual purchases should be 98,000 M. from the combine and 3,000 M. from independent manufacturers, he would be entitled to no discount. If the total, 101,000 M., had been from the combine, he would have received a rebate of 505 M., which is equivalent to 16 8/10 per cent. on the cost of the goods bought outside of the cartel. This is the theory of the latest addition to the already long list of German combines of this class.

Decline of Hand Weaving.

Recent statistics of the European hand weaving industry compiled for a series of years show that the number of hand looms has been and still is steadily decreasing. This is due to the lower cost of machine made goods and the better wages earned by the workers operating power looms. The hand weavers have been reduced to extreme poverty and on account of their lack of work many have become dependents on official charity. Even when working the wages are barely sufficient to purchase the food necessary for their existence. It is stated on good authority that the wages of the women hand weavers average about $1.00 a week and those of the men about $2.00; this includes the labor of the children who wind and spool the yarn.

The rain coat called the mackintosh was named for Charles Mackintosh, who was granted a patent in England in 1767 for the invention of waterproof clothing.

A Worsted Dress Goods Mill.

THE COLLINGWOOD MILLS, PHILADELPHIA, PA.

These mills are among the largest of their kind in the country and manufacture both worsted and carded woolen goods. The mills contain both worsted and woolen spinning machinery, the raw material in the shape of wool being converted into the finished goods, all of the operations being carried on at the works.

The founder of the mills, William H. Folwell, came to Philadelphia forty years ago from Mullica Hill, New Jersey, and engaged in the dry goods business on his own account. He began by selling his goods to the storekeepers from samples which he carried to them. He was successful from the start, and soon opened a jobbing house, forming a partnership with his brother, Nathan T. Folwell, the present head of the firm. In 1867 Mr. Folwell visited the Paris Exposition and was much impressed with the skill of the foreign manufacturers in the manufacture of dress goods and plushes. He investigated the conditions at home and abroad, and became convinced that in order to successfully carry on manufacturing in America it was necessary to have a high tariff to protect the domestic manufacturer from the competition of the cheap and skilled labor of Europe.

The revival of business in 1880 and the reasonable assurance that the protective policy of the government would be maintained, induced the Folwell brothers to establish the Collingwood mills. At first their aim was to manufacture ladies' dress goods for the jobbing trade. Later on, they started the manufacture of mohair plush fabrics and imitation seal skins. After the cloth had been woven it was run, face down, over a dish of melted resin, into which the tips of the fibres dipped slightly. It was then colored black, the resin protecting the tips of the fibres from the dye. After dyeing, the resin was removed and the result was that the ends of the fibres were light while the ground work was black. When plush goods went out of fashion, Folwell Brothers turned their attention to dress goods and cloakings, and have been very successful owing to the thoroughly modern

THE COLLINGWOOD MILLS.

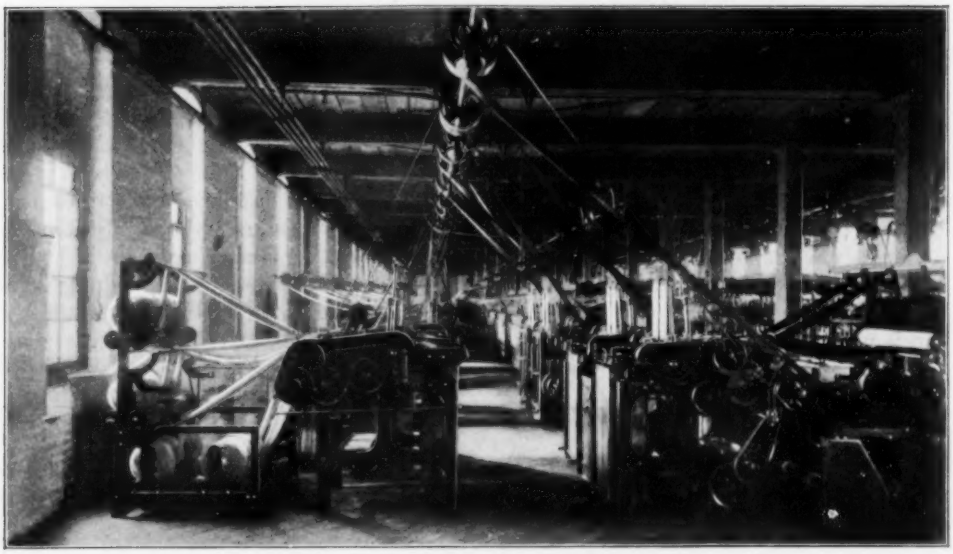


FIG. 2. WORSTED DRAWING ROOM, COLLINGWOOD MILLS.

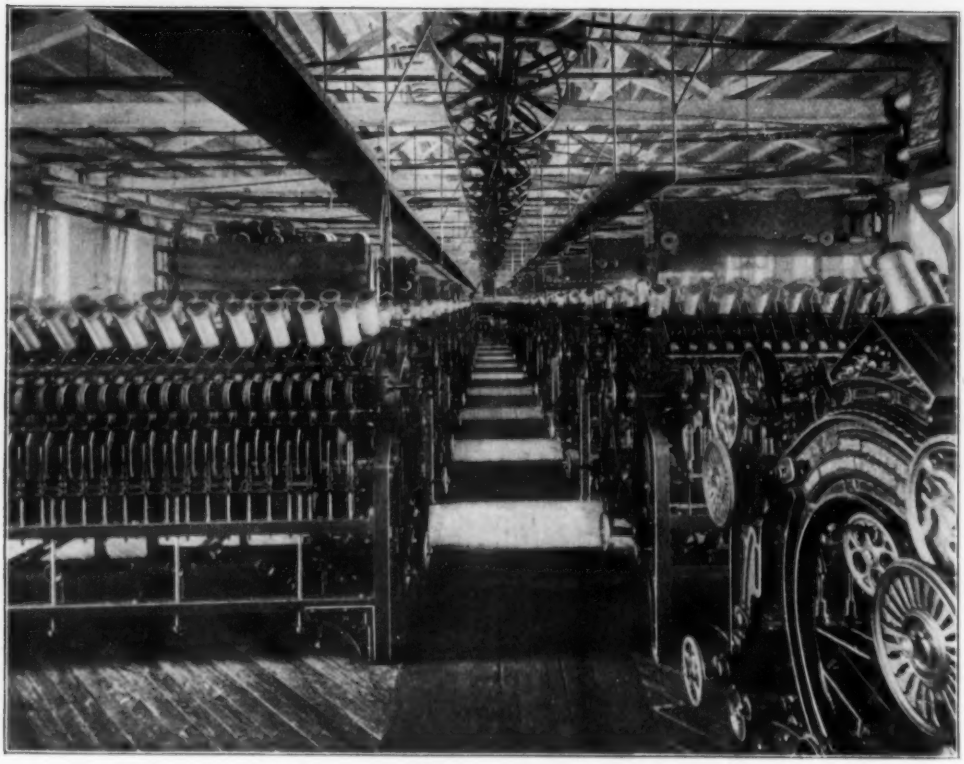


FIG. 3. WORSTED SPINNING ROOM, COLLINGWOOD MILLS.

equipment of their mills and the close touch which they keep with the trade.

William H. Folwell died in August, 1890. He was of a poetic temperament and a patron of the arts, and his good taste as well as his business capacity contributed to his success as a manufacturer.

The Collingwood mills at present have about 1,000 employees, the buildings covering a lot 246 by 400 feet. About 1,700 cuts of 40 yards each are woven per week and the entire product is distributed to the retail trade. The mills produce an unusually large number of fabrics, among them are serges for women, cheviots, whipcords, French serges, prunellas, granites, armures, worsted warp broadcloths, etamines, veilings, English twine cloths, crepe de chines, poplins and fine glorias. One cloth to which they have given the name of Mon reve (my dream), is 40 inches wide, is made with 7,000 ends of fine silk, and woven with 160 picks of No. 90's worsted per inch. The finished fabric is so delicate as to well deserve its name.

The woolen cloths include zibeline, homespun, woolen crash, woolen broadcloths and fancy suitings. Owing to the popularity of white and light colored effects at the present time a special department has been fitted up for their manufacture. The processes are kept distinct from those in which the dark goods are manufactured in order to prevent the light stock from being soiled or mixed with flyings from the dark material.

Our first illustration shows the exterior of the mills. The next, Fig. 2, is a view of the worsted drawing room, which is equipped with the best appliances for the production of fine and uniform roving. At Fig. 3 is a view of the worsted spinning room equipped with Smith frames; Fig. 4 shows a corner of the large weave room and gives a view of the looms used in the production of the wide range of fancy goods manufactured in the mills.

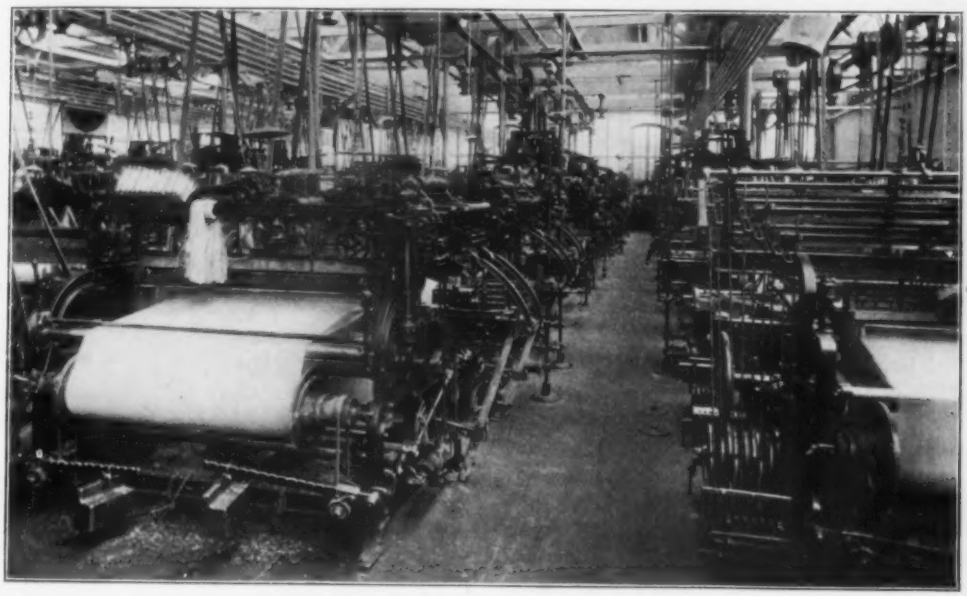


FIG. 4. CORNER OF WEAVE ROOM IN COLLINGWOOD MILLS.

The ancient Egyptians were remarkably skilful in the manipulation of flax, producing linen fabrics far exceeding in fineness any cloths spun and woven today by the most improved mechanical inventions. A piece found in one of their tombs has 540 warp threads to the inch.

Seasonable Fabrics.

MEN'S WEAR.

This market at present is in a state of inactivity, trade is decidedly dull, reorders have been coming in very slowly and have not been as heavy as they were this time a year ago; but there is no cause for any uneasiness or discouragement, the weather all over the country has been most unpropitious; strikes have taken place in most of the large centres, and here in New York the effect of the strikes has been most deterrent upon the retail trade; dealers are inclined to be cheerful, however, and predict that the present month will more than make up for last month's bad showing, and that improved business will soon be in evidence.

Quite a number of buyers have arrived and era of stagnation will soon be over; the opening of lines of 3-4 cotton warp and carded goods, satinets, etc., and a few additional lines of serges has been the principal feature of the week; the price on a number of the lines is the same as that of a year ago, these light serges are shown in ranges from 8 oz. at 60c. up to 14 oz. at $1.20.

The 3-4 satinets shown by Lawrie, Mann & Drowne are at the old price, or the same price as that of last year. The Cleveland serges are at an advance of 2 1/2 per cent. over last year's prices. The Gilbert serges maintain their prestige and are well thought of among the buyers. The market at the present writing is by no means fully open; the longer the opening of fancy woolens and worsteds is deferred the better it will be for all concerned.

There has been an increased demand for fancy overcoatings and indications point to a large sale for goods of this character. Kerseys are slow. Thibets and unfinished worsteds are in active demand. Stevens, Sanford & Handy are sold up on Kilcreggan and Cairngorm cheviot suitings and are withdrawn from the market. The demand for piece dye goods and cheviots is beginning to be felt and the season seems strongly in favor of woolens. Deliveries are fairly good, some few complaints have come to hand from clothiers and a few cancellations have been received.

DRESS GOODS.

There is an undercurrent of strength manifested in this branch of the trade; owing to this being mid-season, there has been no marked activity shown; manufacturers, however, report that fall orders have been very satisfactory throughout, and that a number of duplicates now being received are very gratifying, although the weather has been somewhat unfavorable and the season consequently late, there is a certain amount of buoyancy felt. The principal fabrics in demand are zibelines, tweeds (on the order of men's wear tweeds), armure weaves, cheviots, voiles, twine cloths and etamines. Knotted effects are very popular; one manufacturer stated that his house had been most successful with these goods.

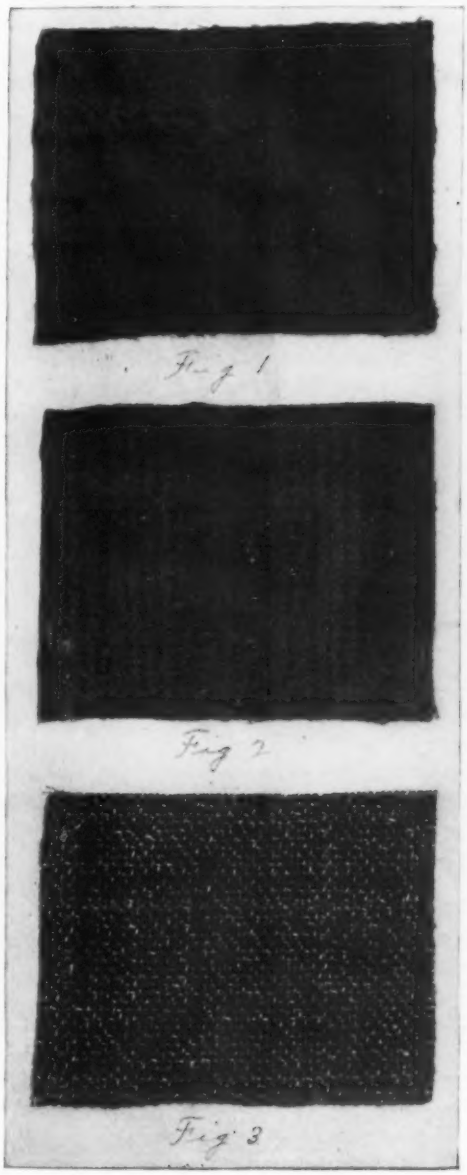
There is a fair demand for meltons and broadcloths. These fabrics make up in the tailor made suits a more sightly garment than the rough goods effect and will always be more or less in vogue. The cutting up trade are buying a fair amount of plain staple fabrics mostly on the cheviot order. Prices, while not showing much in advance, still are firm. Speaking to Mr. Guy Day of Nostrand & Moore, he stated that the best fabric that will probably make the strongest bid for popular favor during the coming fall season will no doubt include zibelines and fancy effects, over plaid Scotch suitings and tweed effects. Melton fancy weave plaids and stripe effects are having a ready sale. The staple cheviot and broadcloth will be as popular as it has been for the last two seasons.

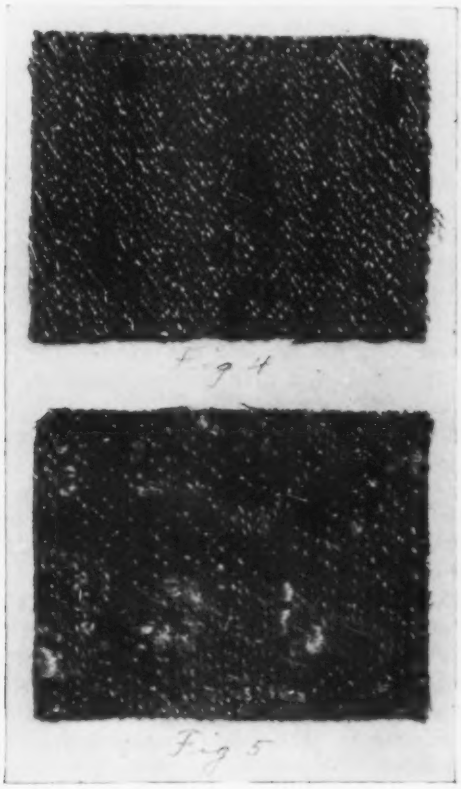
Fig. 1 shows a boucle zibeline stripe in Scotch colors on a camel hair ground and are shown by Skidmore & Muller;. These fabrics possess character and distinction and are sold largely to the houses which control an exclusive trade.

Fig. 2 is also shown by the same house. These are Scotch bourette effects illuminated with bright colors and flecked with white. Their two tone zibeline is of superb quality,

soft to the touch, and these goods come in nineteen different shades of the most desirable fall colorings.

Mr. Beals, of the firm of King & Beals, stated that their firm are very pleased with the business that has been done for fall, and that duplicates were coming in quite freely on the fabric shown at Fig. 3, which is a tweed on the men's wear order. He predicts a big run on goods of this order for the fall and spring wear. Fig. 4 shows another of this firm's most successful numbers. This fabric is a knotted effect tweed, and comes in navy ground and black ground interspersed with white with raised black knots. For spring 1904 Mr. Beals predicts that clear finished goods will prevail in addition to sheer goods such as voiles, mistrals, twine cloths and goods of the chiffon family.





Mr. Stork of Franz Merz, selling through C. A. Auffmordt, stated that his house has had great success with fancy zibelines; in fact, they were sold clean up to the handle. Fancy zibelines similar to Fig. 5 had been one of their most successful numbers. In former seasons it was usual for them to carry a large line of prunellas and plain goods, but this season the demand has not justified them in doing so. This season they have only car-

ried 25 pieces of a number while formerly they carried 250 pieces.

Mohairs are still maintaining their popularity, reorders being quite liberal, with considerable difficulty being experienced in securing some shades. Covert cloths are also quite in demand for fall suitings. Scotch plaids are still being called for in limited quantities for children's wear.

SILKS AND VELVETS.

The silk market is in a somewhat apathetic condition, manufacturers are curtailing production, and the demand seems to be for staple goods such as taffetas, peau de soies and crepe de chine. Speaking to a representative of A. D. Julliard, he remarked that the demand for fancies was only occasionally, and novelties for the time being were completely in the background. Their standard mill at Phillipsburg was in full operation and turning out as many as 150 pieces of crepe de chine a day, this being sufficient evidence to prove that the demand was unabated. He further remarked that the manufacturing of silks under the present conditions is not quite satisfactory, as most of the mills are working on the same class of goods, with the result that competition is too keen to allow a fair margin and that he would welcome the advent of fancy styles, when there would be an opportunity of making a fair profit.

Louisines are in fair request in black and white shepherds checks. The colors most in vogue are champagne, deepening into the beige tints, this will hold first place, with cream second, reds, light blue, wedgewood blue, resedas and other staples following. Japanese silks are strong, especially white, which has been very much in demand for waists. The cutting up trade early in the season placed quite extensive orders for white habutai, some of which have not yet been delivered.

A representative of one of the largest importers, who has recently arrived from the other side, spoke of reds as being one of the most popular shades in Paris. Fig. 6 illustrates one of the handsome costumes he noticed, being red peau de cygne with white polka dots, trimmed with heavy champagne shantung embroidered with red dot to match. Fig. 7 is one of these imported new unobtrusive novelties in panned satin, being a shepherd check with black and white irregular polka dot. Valentine & Bentley are showing a line of 20-inch domestic silk in shepherd check with embroidered chenille dot which is meeting with considerable favor. There has been but a slight advance

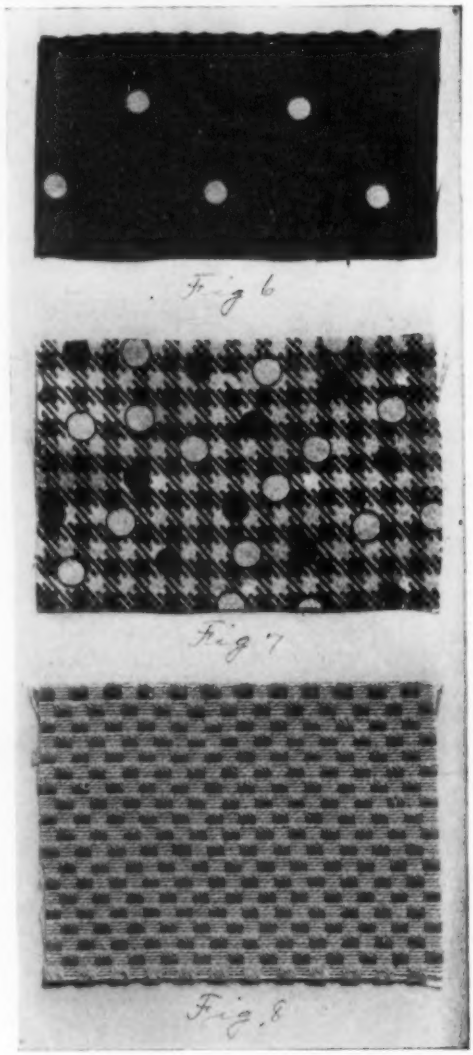


Fig. 6

Fig. 7

Fig. 8

on a few numbers, but the manufacturers claim that they cannot keep their looms going at the present remuneration, and that a higher level is inevitable. Plain cream satin will be the fashionable coat and cloak lining

and cream liberty satin will continue to be the material most in demand for the dressy separate waist.

Velveteens are receiving marked attention and the business already secured is in excess of that of a year ago. Metallic dots and small stripes have been bought freely and importers will have to use their best efforts to secure deliveries by the time promised.

COTTONS.

There has been no material change in the conditions governing the price of the raw material during the month. Speculators are still in control and the price is a trifle higher than a month ago. Speaking to Mr. Lincoln of the firm of Catlin & Co. (who is regarded as being one of the most conservative among the commission men), he stated that the outlook indicated a permanent higher level for the manufactured product, as it is impossible for the mills that are now operating to sell at present prices after they have purchased their new stock of raw material, and those mills that are out of the raw material were compelled to curtail, and for the present practically to go out of business, but from a commission man's point of view business was satisfactory. They were completely sold up on several numbers, more particularly on Canton flannels. He predicted that the present price would be maintained for some little time to come, and that the effect instead of being depressing would be highly advantageous to a large section of the country. It would bring such a prosperity to Dixie that even the little coon cotton picker would feel its effect. Asking Mr. Starbuck, of Taylor, Wendell & Co., whether he thought the present high price was warranted or speculatively fictitious and whether the advances made were justified, he spoke with some degree of confidence and predicted that a slump in the price cannot be looked for for the next six months; while the acreage of the new crop is admittedly larger by about 4 per cent. than that of last year, and the condition of the new crop is now promising, and indications point that it will be up to the average, the demand for the raw material is increasing in volume, which warrants a higher level. Several factors have contributed towards maintaining a higher level in addition to the manipulating proclivities of the speculators. Some of the Southern mills have lost hundreds of cases by floods, others have suffered from the effects of strikes. These conditions may reflect injuriously upon the manufacturer, but they tend to prevent over production, which is at all times a menace to the prosperity of the nation.

WASH GOODS.

Several of the importers are showing their samples of new goods for spring 1904, some of which are extremely attractive, notably the printed warp gauze grenadines, which come in a large variety of combinations and designs. Black and white and navy and white plaid effects in gauze grenadines are most effective. Fig. 8 illustrates a basket weave matellasse in champagne tints which Robt. B. McLea & Co. speak of as being one of their most successful numbers. Their orders for white goods for spring delivery have exceeded their most sanguine expectations and that the demand has been largely for fancy basket weaves and satin damasks with jacquard designs and figures.

LININGS.

Some improvement has been shown, buyers have been more willing to place for contracts, believing that they will not gain much by waiting. The gray cloth market has been advanced and as general buying will soon be necessary, concessions in prices will become more difficult to secure. Mercerized or imitation mercerized effects are the favorites; these finishes are adaptable for the drop skirt so much in vogue at the present time. Gray twills have advanced materially. Silesias are not so much in request, although with manufacturers the demand shows a slight improvement. There has been a fair request made by the clothing trade for serges, Italians and Sicilians both in domestic and foreign. The manufacturers' stocks are very much depleted, many shades being entirely out. Few novelties are being shown and the demand seems to have been diverted from the fancy lines.

Flax was the earliest known vegetable fibre cultivated and manufactured for clothing purposes.

Why Are Woolen Goods Imported Into the United States?

(An address delivered by Morris W. Benjamin, before the Alumni of the Philadelphia Textile School.)

Before proceeding to answer this question, and because it suggests memories of the huge quantities of cheap English goods that were imported under the Wilson tariff, I want to say for myself that, whatever changes may be made in the present tariff, I hope that the new tariff will be so arranged as to bar out the cheap and meritricious fabrics with which the country was flooded under the 40 per cent. schedule of the Wilson bill. I firmly believe, that, had the Wilson tariff provided simply for free wool, with an advalorem duty of 50 per cent. on all manufactures of wool and worsted, the volume of imports would not have been very much greater than under the present tariff. It was the differential rate of 40 per cent. advalorem for manufacturers of wool costing less than 50 cents per pound, that encouraged the Bradford manufacturers to increase the weight of their fabrics by the use of adulterants. Apart from the low price loaded fabrics whose importation was encouraged by the Wilson tariff, I am of the opinion that almost as many medium and high priced fancy woolens for men's wear are imported into this country today as at any time; and so we get back to our question: "Why is it?"

In offering you my answer to this query, I shall use the adjective "English" instead of "imported" because a very large proportion of all the woolens that we import for men's wear is manufactured in England and Scotland, and it will be more convenient to use the word English as including Scotch, than to use the two words in conjunction every time. As a matter of fact, we have for some years purchased more fancy woolens from Scotch than from English manufacturers, the bulk of purchases from England having been on very fine staple fabrics.

And now directly to our question: "Why are English woolens imported into the United States?" I shall give you seven reasons numbering them consecutively in the order of their controlling importance, as they appear to me.

1. Because of the widespread prejudice on the part of the public generally in favor of foreign and against domestic goods. The average layman believes that nearly all domestic goods wear poorly and fade quickly, and that only the imported fabrics hold their colors and give satisfactory service. It is a popular error that is greatly strengthened by the fact that when the merchant tailor or the retail clothier advertises his wares, he almost invariably recommends them as "imported." Nevertheless it is a fact that all the important woolen jobbers in this country, including those that formerly sold only imported fabrics, now carry fine domestic goods, and it is a fact that fine American goods are better than the cheap and medium grades of foreign goods that are sold at about the same prices.

2. The second reason is because they are high-priced. This may sound paradoxical, but it isn't. That they are high-priced, as compared with goods made in this country, is in itself a recommendation to the high grade merchant tailor. The art of fine merchant tailoring has reached in this country a degree of perfection absolutely unapproached in Europe. The fine tailor is beset on all sides by the competition of the moderate-priced tailor, whose clothes, while as a rule, better made than those turned out by English tailors who charge about the same prices, do not represent such a liberal outlay for skilled labor. The cost of the material in a fine suit bears, at most, but a small proportion to the selling price of the suit, but as the selling price declines, the proportionate cost of the material increases, and becomes a question of serious consideration for the merchant tailor, whose customers will only pay a moderate price for their clothes. The high-priced merchant tailor realizes this, and, as a matter of self-protection, he is willing to pay liberal prices for his material.

3. Because fancy styles in English goods are, almost without exception, restricted and

exclusive. Buyers at wholesale of English goods select their styles from pattern blankets submitted by the manufacturers, and these styles are made for each exclusively and in small quantities. The merchant tailor who buys them has the positive assurance that they will not be widely distributed, and so they become in turn exclusive styles in his own stock. It is impossible to exaggerate the importance of this factor in attempting to account for the quantities of foreign fancy styles that are sold in this country. The English or Scotch manufacturer shows to the jobber an almost endless assortment of pattern warps, or of the best combinations cut from the blankets and mounted, for convenience, on cards. The jobber may select three or four colorings out of a blanket, order one piece of each, and have the style positively confined to him for all markets. As an earnest of the manufacturers' good faith in this respect, the balance of the blanket or of the cards is turned over to the purchaser. Contrast this with the usual American method.

4. Because of the greater originality and novelty of style in English woolens. This is such a truism that I need scarcely dwell upon it. Our designers find the source of their inspiration, as a rule, in English samples. More attention is paid in England to this all-important branch of the business, and more expense is lavished upon it. I have known of one mill that employed seven designers constantly, and achieved a world-wide reputation for the creation of original styles and fabrics. Next in value to a genius for the origination of ideas is the capacity to recognize another's novel idea, when one sees it, and, mixing it with one's own brains, to develop it to its utmost possibilities, and perhaps to improve upon it. Many of our American designers have this talent to a remarkable degree, and I have not infrequently seen a novel suggestion in English goods used as a basis for the development of styles which, if not more beautiful than the original, were at least better suited to the taste of the American public.

5. Because of the greater brilliancy and variety of coloring in English, and especially in Scotch fabrics. This is an indisputable fact, but I hesitate to attempt to account for it, lest I find myself treading on dangerous ground, and floundering in the quicksands of half-knowledge. May I not venture, however, in a tentative way, to suggest that perhaps a partial explanation lies in the fact that the Scotch, as a rule, put more ends into their fabrics, making necessary less of the fulling process, which has a tendency to cloud and deaden the colorings? Variety and novelty of coloring are often more important considerations than novelty of style, especially when neat designs are in vogue. You know that it is almost impossible to invent a pattern that shall be extremely modest and at the same time novel; but by the use of new colorings and novel twists, the old simple designs may be rejuvenated and may attain a wider popularity than any high novelty can ever win. And this leads me, by a natural transition, to my next heading.

6. Because of the greater variety of fabrics shown by English manufacturers. The English maker, unhampered by any duty on his raw material, has free access to every variety and grade of wool grown in the world, and can select the particular wool or combinations of wool best calculated to produce the fabric he has in mind. He is untroubled by any nightmares about paying a heavy impost on seventy pounds of grease and dirt in order to secure thirty pounds of clean wool. Besides, if he does not care to spin his own yarns, he has at his command the limitless resources of all the English yarn spinners. They carry in stock an infinite variety of yarns in all grades, all classes and all colorings. The English manufacturer with a new idea has no difficulty in securing the necessary yarns with which to test the value of his idea, without sharing it with his competitors.

7. Because goods made from wools of superlatively finest grades are produced almost exclusively in England. The reasons for this may be found among the explanations I have offered you under several preceding headings. These wools are limited in quantity and the goods produced from them, being very expensive, are in limited demand. The tariff tax upon these wools and yarns spun from them, is so excessive that it would scarcely be worth while to import them under

existing conditions, and for the present, we must be content to acknowledge that woolens de luxe are "made in England."

Whether the period during which the duty on raw wool was repealed, was or was not a disastrous epoch for the growers of domestic wools, I leave it to others to discuss, but that it was an epoch of marvelous improvement in the manufacture of men's wear woolens in this country does not admit of any discussion. Our manufacturers learned from experience the advantage of mixing the finer foreign wools with our coarser domestic fleeces, and they realized that for certain fabrics a large proportion of Australian wool is indispensable. The coloring, the quality and the finish of their fabrics were all greatly improved and this improvement has been continuous despite new tariff conditions.

The better grades of domestic goods are intrinsically finer than the foreign goods that are sold at about the same prices, and we have some mills in this country producing fabrics that the jobber can recommend without any qualification, to the very finest tailoring trade. Some of our finer mills are also following the English custom of making exclusive styles in small quantities—with this difference, that the jobber is called upon to furnish the design, whereas in England the styling originates largely with the manufacturer.

Of all the factors I have referred to as fostering the sale of English woolens in this country, none is so important to the jobber as the fact that in English goods he secures for himself and for his customers exclusive styles. As domestic goods offer as a rule better intrinsic values as compared with the foreign fabrics, on which a duty running from 105 to 130 per cent. has been levied, the progressive jobber of woolens, who desires to avoid buying the widely distributed open market styles, finds a field for the exercise of his judgment and taste in the development of special and exclusive styles in American goods, so that even to buyers of moderate-priced woolens, we are able to offer patterns that will not be found common.

As I survey the present conditions of woolen manufacture in this country, as they have developed during the twenty-five years during which I have been a buyer of woolens, and when I consider the high standard of excellence that has already been attained and the constant growth of domestic goods in the favor of the trade, I feel that the field for the graduates of this institution is a constantly widening one, and offers most inviting prospects of success to the conscientious and well-equipped worker. To concentrate into one sentence the essence of the advice I would offer you, I would say: Develop the artistic equally with the practical and aim always for individuality and originality.

Cost Keeping in Cotton Mills.

BY RICHARD HARRIS.

The subject of cost keeping is of vital importance to every manufacturer. That its importance is recognized, is evidenced by the fact that more time is devoted today to this branch of accounting than has ever been before; and it is very evident that cost figures, if they represent the cost accurately, and statistics gathered for use in connection with cost assembling, are of incalculable value to the management for the guidance of the sales department, etc.

Aside from this there are various reasons which are familiar to every manufacturer and require no special mention here why a system of some sort at least must be maintained. No system has yet been devised that can be adapted to every establishment without some modifications. I recently assisted in the installation of a system for a cotton mill making a large variety of fabrics and operated it for some time, showing results in four weekly periods.

The problem requires much thought and many books have been published in recent years on the subject. It is not my purpose to outline a general plan, but to offer a few sug-

gestions which I hope will be of some assistance to those seeking to improve this department; for undoubtedly it is the earnest desire of all to have as perfect a system as possible, likewise one that is simple and inexpensive to operate.

A manufacturer's functions are twofold—to manufacture and to sell. As these are distinct and severable, accounts should be kept to display the results of both. The use of printed slips throughout the mill for requisitions and reports, etc., specially designed to meet the particular requirements of the mill, is advisable. The cost is nominal and they are labor saving and serve as a guard against omissions. All such forms should be arranged with respect to size, shape and punchings in a way to readily file in post binders.

Attention is first drawn toward raw material. An accurate record must be kept of all cotton purchased: of whom, prices, terms, date of deliveries, grade and marks. A book ruled expressly for this purpose is desirable as a convenient reference.

When an invoice for cotton is received, allot a number to that invoice; and special tags, consecutively numbered, sufficient to cover the quantity shipped should be assigned to the lot. The numbers and reweights are to be noted thereon, to provide a means of identifying the bales when they are taken into the mill. The original marks and numbers are in a majority of cases very indistinct and oftentimes misleading. Have the tags perforated and a portion showing reweight can be detached and sent into the office for checking purposes. For every lot of cotton, a form somewhat similar to Fig. 1 is desirable.

The net cost per pound, based on reweights, plus cost of freight and any additional charges (also insurance and interest if the management elects to treat the latter two items as part of the cost of cotton) is calculated. The tags taken from the bales as they are opened in the picker room, are to be turned into the office at the end of each week; and at the expiration of the time limit agreed upon for assembling costs, whether in four weekly periods or otherwise, a summary is made of the bales opened, giving the various grades, net cost of each grade, and the total pounds, and the value thereof. From these figures deduct the quantity of card room waste made, and the amount realized from the sale of the same. A simple division gives the average cost per pound of cotton put into operation during the period, and this figure is used as a basis in subsequent calculations.

The overseers should be called upon to keep an accurate record of the production of the department in their charge and report

Marks K A G Grade Che. Ga Lot no 57 Bales 50/99 ENG

Bought of VanderVeer & Son Date of Inv. March 14th 1903

Invoice weight 17,372 lb Purchase Price 11 1/2 ¢

Reweight 17,128 lb Amount of Inv. 1992.26

Shortage or overage Short 40 Freight & Incidentals Chgs Frt. 48.70

General condition Good Average Cost per pound .118 On contract of Jan 10-03

Shippers Bale no.	Our no.	Gross weight	Tare	Net weight	Condition	Date used	Balance Bales	Balance Pounds
92	50	420	13	417	Fair	3/21		
104	51	362	11	351	Fair	3/26		
27	52	428	10	418	Poor	3/27	49	16 Overt

FIG. 1.

same on forms provided for that purpose to the office as often as is deemed expedient. The spinner should keep a record of frame production of spinning and twisting and number of employees running each frame. In cases where changes in the sizes of yarn occur with more or less frequency, the date and hour of such change should be recorded. A form similar to Fig. 2 would perhaps be found desirable. By changing the wording the same form could be adapted to the winding department.

For the weaving department something like

_____ Mills

Report of Prod. of Spinning Dept.

Weekending March 21 190

Description	Quantity	Yarn No.	Spun	Spooled	Doubled	Twisted	Tubed	Reeled	Spindles Run	Hours Run
Egyptian	7320	12^2	X	X	X				2172	56
Egyptian Rov. T.	5420	14^3	X	X					2100	56
Combed Peeler	1026	10^5		X	X				408	56

FIG. 2.

Fig. 3 would perhaps serve the purpose well. Great care must be exercised in making up the foregoing reports. Cost calculations are, of course, based on production; and if these reports are incorrect it naturally follows that the indicated cost will not be the true one. No system is proof against errors, but if these summaries can be so arranged that they will greatly facilitate the locating of any clerical errors, a plan of this kind should appeal to every manufacturer. With correct and proper summaries of production at the right places in the mill and correct summaries of labor applied on production, gathered from the pay roll, it remains to apportion fixed charges on production. There is no rule as to the most correct method to adopt in apportioning these indirect expenses. Many things have to be taken into consideration, such as value of machinery employed, power required, time spent, space occupied, etc.

It is of the utmost importance that an accurate record be kept of the various supplies furnished each department of the mill at cost price; also waste made. Fixed charges, such as insurance, power, heat and light, taxes, interest charges, repairs to plant, must be prorated over the number of periods constituting a year. It must be admitted that it would be extremely unfair to have taxes for instance for a whole year charged into costs during the period in which payment is made. The logical plan is to charge each period with its share of these expenses and since bills are not rendered until they become due the proper course would be to approximate the amounts, being guided by past experiences, and when the time comes for the payment of these bills you can then readily ascertain to what extent your estimates differ and make whatever slight adjustment may be necessary.

What is the best method of keeping these records? In a majority of the larger mills it

becomes necessary to have numerous subdivisions of expense accounts to enable the managers to keep a close watch on what is going on. A plan which the writer believes would work satisfactorily is to provide a specially ruled ledger and open the first account with cotton, debiting the number of pounds and value thereof when last physical inventory was taken and debiting all subsequent purchases at cost. Credit periodically the cotton taken into the mill at cost, and waste production. The balance at any time represents the cost value of the stock on hand. This same rule can be applied to yarns purchased. An account should be opened with each department and subordinate accounts of the various supplies, repairs, etc., whatever subdivisions are desired, grouped according to departments.

In opening these accounts they should be debited with the goods on hand when inventory is taken and with goods bought from time to time and credited with the amounts charged into costs, which in the case of any

Weaving Dept. ____ Mills
Record of Production
For week ending March 21st 1903

Description	Weaver	Loom No	Length	Width	Quantity	Actual weight	Standard weight	Date
#20 Duck	Mary Smith	47	✓	42"	740	8.03	8.04	3/19
#72 "	Sarah Jones	201	✓	48"	650	8.10	8.12	3/20
#14 "Special"	Frank Peters	83	53	87	337	31.5	32	3/21

FIG. 3.

____ Mills Summary of Weaving For period ending 3/21 '03

#20 Duck - Knowles Looms			#72 Duck - Northrop Looms			#14 "Special" Knowles Looms		
Quant.	Lbs	Labor	Quant	Lbs	Labor	Quant.	Lbs.	Labor
142	71	4.12	62	41	2.40	231	427	12.40
327	168	9.18	141	88	5.01	184	340	10.04
840	432	24.02	327	201	2.10	203	407	11.27
293	151	7.41	801	530	23.87	301	617	13.14
720	328	21.08	624	412	20.90	428	807	15.10
						605	1190	17.32

FIG. 4.

particular supply should be according to consumption. The balance in a later account when next inventory is taken should be equivalent to value of goods on hand at that time, or within a small percentage. Waste accounts should be grouped together and the percentages the different wastes bear to pounds of cotton or yarn used can be calculated and comparisons made periodically. This in itself is an important item and if the waste accounts are properly kept, will furnish to the manufacturer some valuable information as to the working of his business. A general summary sheet which can be utilized for various purposes is a very necessary part of an office equipment. Fig. 4 shows the writer's idea of such a sheet.

A ledger of the description given above, which may be extended indefinitely, will enable you to make any analysis the business may require.

Curl in Wool.

THE REAL SIGNIFICANCE OF "CRIMP" TO BOTH GROWER AND MANUFACTURER.

BY S. B. H.

It has now come to be a settled fact that wool is a modified form of hair. It is distinguished from hair, however, by certain special, prominent, and important characterictics, while retaining to some extent other properties which are common to the natural covering of all animals alike. Analysis has shown that wool is composed practically of the same chemical bodies as skin, hair, and the feathers of birds. Wool is distinctly a growth from the skin, being rooted in it, deriving its support and nutriment from it, and partaking with it in precise sympathy with its prosperity and adversity—growing luxuriantly and in its best form when the animal is in a state of health, and suffering with it in times of sickness and disease.

WOOL VERSUS KEMPS.

Now, no one can pick up a lock of wool and examine it at all without noticing that every fibre possesses more or less "crimp" or "curl," and this feature is an essential characteristic always present in wool, which is not an inherent quality in hair. Anyone at all conversant with handling sheep and wool knows distinctly that as a wool fibre comes to the natural hair of an animal, it loses all curl, the fibre being straight like a pipe. I suppose every reader will have taken the trouble to look carefully at a "kemp" or a dead hair. If not, then do so, and if a kemp is placed alongside a wool fibre the straight stalk-like kemp will appear in strong distinction to the curly twisting nature of the wool fibre. Kemps have always been straight like hair, and to the end of the chapter will remain so, and no surer sign is there of a fleece being a bad one than the presence of kemps in that fleece. It should be the object of every sheepbreeder to breed out these kemps, for their presence is most undesirable from the manufacturer's standpoint, fully as much as that of the grower.

CURL NOT A "FAD."

In years gone by many woolgrowers have had a great "fad" to produce fleeces as curly and wavy as possible. I hardly think that growers today are as much concerned in having "curly fleeces" as their forefathers were, for in the "good old days" of sheepbreeding and woolgrowing curl was an important point that was watched assiduously by both English and colonial woolgrowers. I have heard many a time men not accustomed to handling fleeces exclaim at once on seeing one: "How curly it is!" as if the crimpy nature of the fibres impressed themselves most on the mind of the speaker. Now, to a large extent, this fad rests on a very sound foundation, and is to a large extent justified, plenty of Bradford spinners wishing today that this feature was considered more by English woolgrowers than is today apparent. This question of curl in wool seems to have fallen on evil days, but there is no need that it should, and if this article sets busy brains thinking, and pedigree

sheepbreeders to look into this point, then some practical good is bound to result.

CAUSE OF CURLINESS.

It is rather difficult to say exactly how this valuable property is caused or formed, many noted men having different ideas, each having a claim to be heard. My good friend, Mr. Thomas Burgess, who spent a good number of years in one of the leading London wool-brokers' offices, says that "as soon as the point of the fibre has protruded through the skin of the animal, a series of growths takes place, a small part of the epidermis is converted into wool, and then a rest ensues. One side grows faster than another, and hence probably the curly form of the fibre. When another growth takes place, another ring is added, the new growth pushing up the hair from below." On this point Dr. Bowman remarks: "The finer the wool the greater the tendency to curl, for when the diameter of the fibre is 1/840th of an inch, the number of curves is more than double that which pertains to the fibre whose diameter is 1/510th of an inch." It is well known that fibres taken from the same fleece vary very materially in diameter, but the principle of finer the quality and greater the curl, and fewer the crimps in coarse fibres, is now acknowledged by all wool experts alike. Another American authority (Mr. Stephen Powers) has said that the "crimp is caused by frequent, but somewhat irregular, well-marked, and more or less spirally-arranged thickenings of the cortex of the fibre. These thickenings of the cortical layer occur first on one side of the fibre, then on the other, which gives it its wavy and sinuous character." I might here say that "the cortex of the fibre" means the outside or external part of the fibre. Hence I think we may safely say that the curly, wavy, or twisted character of all wool is caused by the unequal contraction of the surface of the fibre.

ANOTHER CAUSE OF CURL.

Anyone associated with wool knows something about its hygroscopic nature, that is, its readiness to absorb and hold moisture in its cells. Put a 500 pound bale of wool down into a damp, dark cellar for a few weeks, and I will guarantee when brought out again and weighed it will turn the scale at 2 lbs. or 3 lbs. more than it did when it went in. The "watering can" has been used hundreds of times when a conditioning house was an unknown factor in connection with the wool trade, and because wool used to be largely "conditioned"; it is now found expedient to have a standard rule allowing for the regain of moisture in wool, tops, noils and yarns, the standard allowance and regain for wool and waste in Bradford being 16 per cent., tops combed with oil a regain of 19 per cent., and tops combed without oil 18 1/4 per cent. Readers may not know, but the curl in wool can be temporarily and entirely removed by wetting the fibre in hot water and drying same in a stretched condition. On the other hand, an artificial curl can be obtained by unequal drying, the same principle being turned to practical account in the curling of feathers and hair. One feature of the curl in wool is that the crimps are placed transversely across the fibre, and never in a longitudinal direction. It is here that we have a true indication of quality and character.

HOWCURL VARIES.

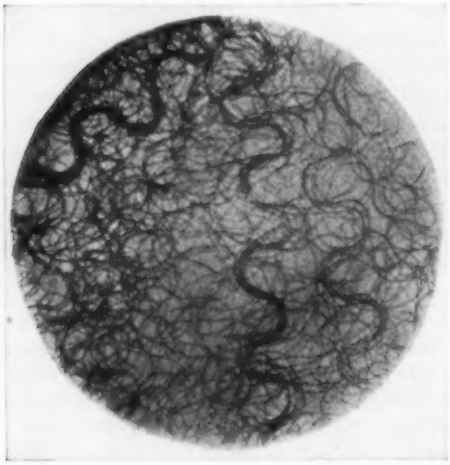
The amount of curl in different samples of wool, as can be easily imagined, varies considerably, being as a rule greatest in finer qualities, and only slightly developed, and sometimes almost entirely absent in wools like Scotch Blackface or other mountain breeds. The diameter of the wool fibre varies considerably, some being as low as 300th part of an inch, and others up to 2000th part of an inch. As the reader will easily see, we have here two extremes, and the wool is almost as wide as the two poles in point of quality and character. Now it is not my intention to discuss the subject from a theoretical point of view, but to look at the practical side of the question in the interests of both grower and manufacturer alike. The curl is there for a purpose; it serves an indispensable function in the hands of the spinner, and should be looked to by those who have the wool to produce, for it can be put down as a fundamental fact that the greater the curl the more valuable is the wool.

THE UTILITY AND PURPOSE OF CRIMPS.

The property of curliness in wool is per-

haps the most valuable to the spinner, since it enables him to produce a much finer thread than would be possible in its absence. Ex-

FIG. 1. FINEST NAVY WOOL KNOWN, 100'S QUALITY.



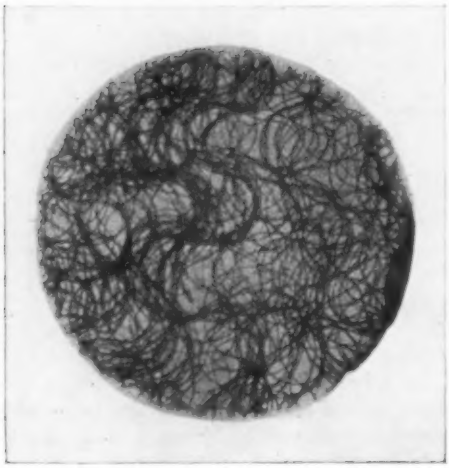


FIG. 2. SECOND CLASS OF NO. 1.

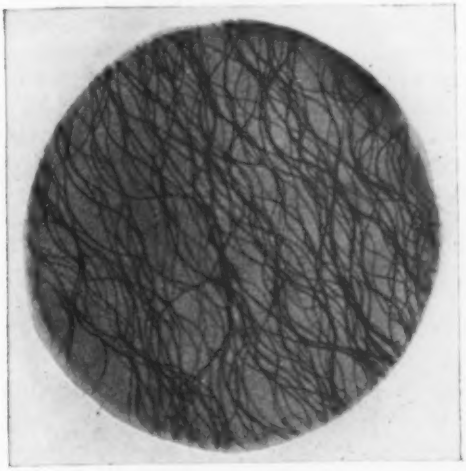
perience has proved over and over again that the best spinning wool, and that which will produce the smallest yarn, is always a fine, crimpy wool. Some classes of merinos are a good deal finer than others, as shown in the illustrations, and a spinner knows at once by the character of the "top" whether or not it will spin readily to the length required. By reason of the greater development of curl in wool than in cotton, it is possible to spin a thread composed of fewer fibres with the former than the latter. That means to say that a spun thread of wool will contain fewer fibres than will a cotton thread spun to the same thickness. This is the very point to which the attention of breeders, staplers, spinners, and manufacturers has often been directed, and there prevails a popular belief that fineness in the crimp corresponds in all cases with fineness in the fibre, and while there are prominent exceptions to this rule, experience has found, as well as a comparison of results, that this belief is not altogether unjustifiable. Such a relation does exist in very many instances, but it is not altogether universal, and it cannot fully be accepted as a means of determining the fineness of the fibre of any sample under examination.

The subject of fineness of fibre we are not at present discussing; that can be left to a future time, crimp or curl relating specifically to the spinning property of wool, combined with fineness. Of course, it is true that as a general rule, the coarser fibres have fewer crimps per inch than the finer ones, and for all practical purposes this can be taken as a settled principle, yet the crimp of the fibre cannot always be accepted as a criterion of the absolute degree of fineness. It is only necessary, as Mr. Wm. M'Murtrie has said, "to make a few comparisons to see this, and though among the breeders considerable importance is attached to it, and dealers and graders often use it in making their classifications based upon fineness, its true relation has been fully recognized by those who have made a careful examination of the staple in a scientific way."

There can be no doubt that distinctions in the fineness of the fibre may, with long experience and practice, be determined by the senses of sight and touch, but determinations made in this way, as they must necessarily do, because of the naturally wide variations of individual appreciation and judgment, have given rise to vexatious and perplexing disputes, and are even less reliable than the differences in the crimp. There is, however, no quibbling about the general principle that curl in wool is a true indication of quality and breed, and it is these two features which must commend themselves to the notice of every

breeder. They also help to promote and assist to impart that elasticity which is such a leading feature in merino wool, a valuable

FIG. 3. SUPER PORT PHILIP HAGGETT, NEARLY STRAIGHT.



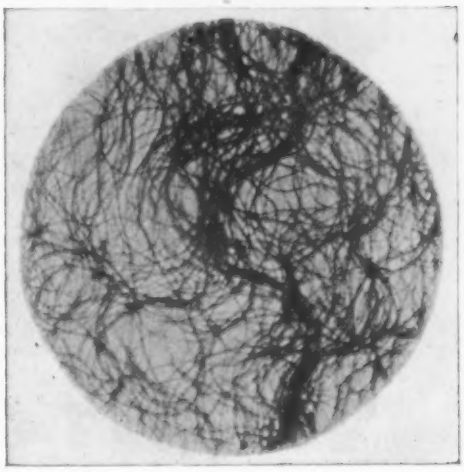


FIG. 4. WOOL FROM BRYANTON FLOCK.

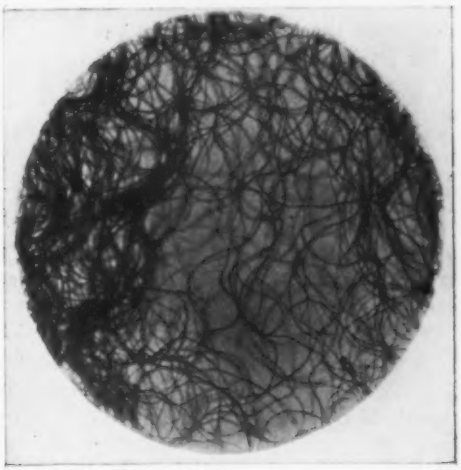
property which is far in excess of that possessed by any other class or breed of wool.

AN INTERESTING TABLE.

Here is a table showing a near approximate number of crimps in the various breeds of wool:

Breed.	Crimps.
Merino average	16 to 20
Merino super	24 to 30
Merino strong	12 to 16
Spanish merino	20 to 24
French merino	18 to 22
Silesian merino	20 to 24
First cross Australian Merino and Lincoln	10 to 16
Lincoln	4 to 6
Southdown	12 to 15
Shropshire	10 to 13
Leicester	6 to 8
Blackfaced	1 to 3

FIG. 5. WOOL FROM GREENVALE FLOCK.



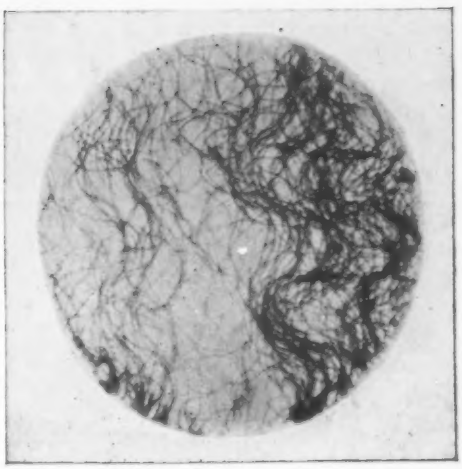


FIG. 6. WOOL FROM WESTBANK FLOCK.

PRACTICAL EXAMPLES.

Let us look at our illustrations, for they are to every sheep and wool-man of special interest, and photographed especially for this issue. At Fig. 1 we have a sample of the very finest merino wool that was ever grown, or at least that it has been found possible to obtain. The spinner who supplied this sample said that he wished he could buy fifty bales of wool like it, but he was afraid if he searched Australia through they could not be found. That I hardly agree with, for the simple fact that several flocks could be named which are known to grow wool that will spin up to from 90's to 100's counts. Still this illustration is splendid as showing the curl in the wool, but as for its being a good commercial wool to the grower, that is a question on which I venture no opinion.

Fig. 2 shows again a very good curl, but hardly up to No. 1, although the wool was taken out of the same flock. Really this is the second quality out of No. 1, and may be classed as an 80's wool. It shows plenty of character and style, and can be classed as a superfine merino.

At Fig. 3 we have a marked distinction, and a wool that needs the undivided attention of every wool grower. How straight are these wool fibres compared with the two previous illustrations. This photograph was taken from a super Port Phillip hogget wool, and if the name of the flock was mentioned, it would command the respect of the reader. And still for all that there is a very marked absence of curl, the fibres being more like "glass rods," as the gentleman said who supplied the sample. Although a good wool, and would spin from a 64's to 70's quality, still the fibres are too straight and stiff.

This sample at Fig. 4 was taken from the noted Bryanton flock, and shows a commendable degree of curl. Of course, it is nothing near as fine as 1 and 2, but it is a better wool in my opinion than No. 3.

Fig. 5 was photographed from a sample taken from the Greenvale flock, and here again we have a good wool, while at Fig. 6 the wool was photographed from a sample taken from the Westbank flock. All these samples were magnified exactly the same at 120 deg., and they offer a series of excellent studies to every breeder and manufacturer both at home and abroad.

Pensioning German Workmen.

Nowhere has the pensioning of workmen and insuring them against accidents been carried so far as in Germany. In spite of this fact it is the custom even in Germany to refer to the amount received by the individual as a mere pittance and of but little account in relieving his distress. This sentiment is especially strong among the workmen themselves. In a recent issue the Leipziger Monatschrift for Textil-Industrie attempts to show the unfairness of this view of a statement of the total amount expended for 1902 on account of "work insurance," as it is called. The figures are as follows:

For Accidents,	834,566 persons	$26,801,393
For Invalids,	1,100,000 persons	30,250,000
For Sickness,	4,800,000 persons	51,500,000
Total	6,735,000	$108,551,393

These figures are rather impressive, but lose some of their force when we consider that each beneficiary received for the year but $16.12. This amount certainly does give color to the popular German opinion of paltriness. On the other hand $108,551,393 is a heavy charge on the industries of any country, and especially of one like Germany, where wages are low and manufactured products are largely sold in competition with other countries in the markets of the world, often in spite of opposing tariffs like our own. Of the $108,551,393, the imperial treasury contributed $10,350,000, the working people $45,500,000, and the balance, $52,701,393, was raised by special taxation of the industries.

This system of "work insurance" is of comparatively recent growth. In 1885 the total expense was but $375,000, an insignificant sum compared with today's expenditures. As late as 1891 the amount was but $10,150,000, or less than one-tenth of last year's total.

The increase from now on is not expected to be as rapid, but the prediction is made that in three years the expenditure will reach $125,000,000.

Sulphur Colors and Their Application.

BY LEICESTER DA COSTA WARD,

Winner of the Textile World Record Gold Medal for General Excellence in Dyeing and Chemistry, at the Philadelphia Textile School, 1903. The following thesis since was written in competition for the medal.

Although the majority of sulphur colors have been only recently put upon the market, the original sulphur color, i. e., Cachu de Laval, has been used for nearly thirty years, having been discovered in 1873 by two French chemists, Croissant and Bertouniere. Henry Vidal published his first patent in 1893 and this was followed by many others, his chief one being in 1896. In this he gave details and formulæ for the manufacture of Vidal Black, stating that by the action of sulphur on para-amidophenol two distinct products are found, one being intermediate to the other.

In the first place, two molecules of para-amidophenol react with sulphur forming para-dioxythiasine and ammonia.

The ammonia so produced reacts in the presence of sulphur and two molecules of para-dioxythiasine, to form para-dioxytetraphenylthiasine

By taking para-phenylenediamine instead of para-amidophenol, the corresponding diamido compound is obtained, and by taking one molecule of para-amidophenol and one molecule of para-phenylenediamine the corresponding oxyamido compound is obtained. These bodies, representing a di-phenol, a diamine and an amidophenol respectively are black coloring matters of the sulphur black class.

Another class of bodies which have become important as starting points for the production of sulphur colors are the chlorine derivatives of benzene and toluene. Dinitrochlorbenzene is very commonly used and when boiled with amines in the presence of sodium acetate, the chlorine combines with the hydrogen of the amido group. These intermediate products when heated with sulphur and alkaline sulphides yield sulphur colors. The colors are thus produced, for the most part, by the joint action of alkaline sulphides and sulphur upon aromatic bases. These bases consist of the amido, nitro and oxy substitution derivatives of benzene, toluene and diphenylamine.

The general process employed for the manufacture of these colors is as follows:

Sodium sulphide, sulphur and the base are fused in an open pan by direct heating to 100-200 degrees C., or more depending upon the nature of the dyestuff desired.

As regards their constitution, but little is known concerning sulphur colors. These colors are fast to light, milling, acids, alkalies, crabbing, boiling with chrome, and to mercerization. Their fastness to acid allows their use in cross-dyeing.

The theory of dyeing with sulphur colors depends upon the fact that the color is soluble in an alkaline reducing agent, and if the fabric be impregnated with this solution, on subsequent oxidation with an acid oxidizing agent, such as bichromate and sulphuric acid, the color is oxydized and fixed on the fibre in an insoluble form.

The sulphur colors, notwithstanding the large amount of salt used in the bath, do not exhaust well, therefore it follows that the

shorter the bath the better are the results obtained and less dyestuff is required.

Copper vessels are not at all suitable for sulphur color dyeing as they are chemically acted upon and have a deleterious effect upon the shade. Iron or wooden vats should be used and steam coils are preferable to open steam pipes in order to avoid dilution of the bath.

Thorough washing after dyeing is of the utmost importance and where fastness to rubbing is required is absolutely essential before and after chroming. In dyeing sulphur colors a large percentage, in some cases as high as 60 per cent., is required for the first bath, but for a standing bath this can usually be reduced to 10 or 15 per cent.

A black of superb tone and one which will withstand the heaviest milling is obtained by topping sulphur blacks in a weak aniline black bath. This process is an oxidation one and develops the sulphur black at the same time that the aniline black is being formed on the fibre. This method is noteworthy in that if the cotton is uneven before topping, this unevenness is not noticeable after the production of the aniline black, which is surprising seeing how difficult it is to obtain even shades with either alone.

The ordinary process of development of sulphur colors is to treat the goods with various metallic salts, those of chromium and copper being the most common. The use of bichromate and sulphuric acid gives the best result. The black obtained by copper sulphate is also very good, but duller than that by chrome and sulphuric acid. The blacks obtained by chrome and acetic acid, etc., are also inferior to that obtained by using chrome and sulphuric.

A thorough washing after development is of utmost importance in order to remove all traces of acid. The failure to do so may be the foundation of complaints that sulphur dyes tender the fibre. In order to insure the removal of all acid it is best to make the last rinsing bath alkaline with soda ash. It has been proven conclusively that tendering does not take place in the dyebath itself, which is even said to increase the strength of the yarn ten per cent. If the chrome bath be worked according to instructions and the temperature kept below 160 degrees, F., no tendering will take place there. The causes of tendering may be summed up as follows: 1, Acid left in the fibre due to insufficient washing, and 2, Partial decomposition of the dyestuff with the precipitation of sulphur and its subsequent oxidation to sulphuric acid.

It is very difficult to dye a sulphur black in an ordinary vat, without the resulting shade being bronzy. This can be remedied by after-soaping or by a "softening" process, i. e., by treatment with an emulsion of oil and soap.

The earliest sulphur blacks all required chroming, but the demand arose for dyes doing away with this extra operation; a demand which has now been supplied. The range of sulphur colors is not confined to black but includes such colors as blue, grey, brown, olive, green, orange and yellow, but, strange to say, reds do not seem to be obtainable.

All of the sulphur colors may be topped with various basic dyes. The shades so produced are very bloomy, but it must be borne in mind that the basic colors retain their characteristic property of being fugitive to light.

Another method of topping is with alizarines. The chrome used in the development of the sulphur colors acts as a mordant for the alizarines. These shades are fast and a large number of interesting effects can be obtained.

The method of topping with alizarines is as follows:

Prepare a cold bath containing the desired amount of alizarine dye. Enter the sulphur dyed material which has been chromed and raise to a boil. Boil until exhausted. Now add 1 per cent. of chrome and boil for 10 or 15 minutes longer.

By treating cotton dyed with sulphur colors with diazo solutions, such as diazotized para-nitraniline, a change is effected by which the color is rendered yellower, more intense and absolutely fast to milling. This process is especially advantageous for brown sulphur colors such as Immedial Browns, Katigene Browns, Kryogene Browns and Sulphogene Browns by which full yellowish shades are obtained. The cotton is dyed in the usual way with the sulphur color, washed

and treated in a separate bath with diazotized para-nitraniline. After remaining in the diazo solution for a short time, the cotton is taken out, washed and dried. In place of para-nitraniline, meta-nitraniline or nitro-toluidine can be employed.

Sulphur dyes have never had much application to wool owing to the injurious action of the alkaline sulphides upon the fibre, but the following process seems to overcome this defect to a considerable extent. Most of the sulphur colors in alkaline solution can by the use of energetic reducing agents such as sodium hydrosulphite, be transformed into colorless lenco-bodies. Thereby it has become possible to dye wool with sulphur dyes by a very simple process. The best results are obtained by using sodium hydrosulphide, the shades produced being very fast. The operation is carried out in an analogous manner to indigo dyeing with the "hydrosulphide vat," the only difference being that with sulphur dyes the goods must be after chromed. If one has dyed a sulphur color too heavy a shade, to reduce it a weak bath of sodium sulphide should be used. The sulphur blacks are taking long strides toward replacing aniline black owing to their being faster to rubbing. They do not produce much dust in weaving and this is an important consideration where other colors are being woven in the same room.

Sulphur dyes may also be developed on the fibre. The cloth is padded, or printed with mixtures of certain organic compounds and sodium sulphide and then dried and steamed. The shades produced in this manner are very deep and fast, being in no way inferior to those obtained by direct dyeing with sulphur colors. The following organic compounds are the most important for this purpose: Dinitrophenol, nitro-amidophenol, para-amidophenol, ortho-para-diamido - para - oxydiphenylamine, ortho-para-nitro-amido-para-oxydiphenylamine, and, para-di-methalamido-para-oxydiphenylamine. For instance, the cotton is padded by means of a solution containing 180 grams of sodium tetrasulphide and 60 grams of para-amidophenol; it is steamed for 1 hour at 1 atmosphere pressure, either in the damp or dry state, rinsed and dried. The resulting blue-black shade is of remarkable fastness. The amido-phenol can be replaced by an equivalent amount of any of the compounds mentioned above, para-di-methylamido-para-oxydiphenylamine, in particular, producing blue shades.

Sulphur dyes give by far the best results hitherto obtained in hosiery dyeing, bleeding and running only taking place when the rinsing has been badly done. Many sulphur dyes are substantive, but others, as before stated, have to be "fixed" by after-treatment with chrome or blue stone. These two reagents are not only the cheapest but give the best results. The only important point with all sulphur blacks, without reference to the peculiarities of the different baths, is that they must be dyed at a boil. If this be neglected the color will be inferior in all its qualities. Hosiery dyed with sulphur blacks wear quite as well as those dyed with aniline black, also the cost is less and the apparatus much simpler. Besides the process is more rapid and at the same time there is no danger of the fibre being injured as is frequently the case with aniline black. It is advisable to dye the cotton in the yarn as better results are obtained than by dyeing the finished goods.

The sulphur colors have found, so far, but limited application in calico-printing, their want of solubility in ordinary solvents being the chief drawback to their use. Also the use of sodium sulphide as a solvent is never admissible on account of its action upon the copper rollers, although it has been proposed by the Elberfeld Co. to plate the rollers with nickel. Too large a use of sodium hydrate is not admissible on account of the trouble arising with the thickening agents and the difficulty in handling caustic preparations. Leopold Cassella & Co. have found that by using sodium bisulphide and caustic soda as solvents, no difficulty is met with in applying some, at least, of the immedial colors. So far Immedial Blacks NR and NB, Browns G and B, Immedial Dark Brown and Immedial Direct Blue B have been applied by this process.

The following formulæ are given for Immedial Blacks NB and NR. Those for the other colors mentioned are analogous:

18 oz. of the dyestuff and 13½ oz. of sodium bisulphide, 70 degrees, Tw., are mixed and heated to 150 degrees, F., and to this is added

13½ oz. of water, 2 lbs. of thickener (given below), and 1½ lbs. of caustic soda, 77 degrees, Tw. The thickener is made as follows:

2½ lbs. British gum.
2½ lbs. Gum liquor (1:1).
1¼ pints water.
10 oz. Turkey red oil.

After printing, the goods are steamed for one-half to three-quarters of an hour at 7½ pounds pressure. The color is then raised to its proper tone by passing the cloth through a bath consisting of the following ingredients dissolved in ten gallons of water:

1½ oz. potassium bichromate.
2½ oz. chrome alum.
3 lbs. acetic acid.
4 oz. hydrochloric acid.

The material is then soaped and finished in the usual manner. The results obtained by this method are good, the designs being sharp and clear and fast to washing, soaping, etc.

In order to avoid the use of sodium sulphide in the dyeing and printing of sulphur colors, attempts have been made to substitute in its place glucose and alkalies, but this method cannot be applied to the animal fibres as the action of the caustic alkali and glucose is even more injurious to wool and silk than is sodium sulphide. The animal fibre, however, is not impaired if the alkaline sulphide and glucose, or similarly acting compounds are used together. At the same time the affinity of the sulphur colors to the animal fibre is much increased and the colors dyed with sulphur dyes may therefore be obtained on mixed goods, composed of animal and vegetable fibres with an equal depth of shade on both. Generally it is sufficient to use 5 to 10 grams of glucose for every litre of liquor. For example: Cloth composed of wool and cotton is worked for one hour at 80 degrees, C., in a bath containing per litre:

5 grains of color (dyestuff) (Immedial Blk. V Extra).
5 grains of crystallized sodium sulphide.
3 grains of soda ash.
7 grains of glucose.
30 grains of salt.

It is then washed well and brightened in a slightly acid bath, finally rinsed in dilute sodium acetate and dried.

All other sulphur colors such as Immedial Brown, Immedial Blue, Katigene Black, Katigene Brown, Eclipse Black, Sulphur Black, Kryogene Black, Pyrogene Brown, etc., may be used in an analogous manner. Glucose may be replaced by tannin with approximately similar results.

The same process may be used in dyeing leather, which is materially changed by alkaline sulphides but keeps its softness if glucose is present in the liquor. For instance, the leather is brushed with a solution containing per liter:

50 grams of dyestuff.
20 grams of crystallized sodium sulphide.
30 grains of glucose.
20 grains Turkey red oil.

The leather may then be dried directly or first treated with acid, bichromate or other metallic salt. The destruction of the color on goods dyed with sulphur colors, thus giving discharge effects, may be effected by means of the chlorates of aluminium or manganese, with or without other oxidizing agents. The process is illustrated as follows: Calico dyed in the usual manner with 20 per cent. of Katigene Black is printed with a discharge paste consisting of the following ingredients:

22 kilo. of British gum.
5 litres of water.
56 kilo. of aluminium chlorate, 42° Tw.

When cold add

15 kilos. of sodium chlorate.
2 kilos. potassium ferricyanide.

After printing, steam for one to three minutes, without pressure, wash and soap.

The chlorate discharges used for sulphur colors have not always had the desired effect. It is claimed that this can be obtained by printing metallic salts such as zinc, copper or manganese acetates, sulphates or nitrates, or mixtures of these upon the goods, those metals forming insoluble lakes with sulphur colors. This is a reserve style and the following example is given as an illustration:

The goods are printed with the following reserve which is boiled up and then used cold:

200 grams zinc sulphate.
200 grams water.
200 grams kolin.
350 grams gum thickening (1:1).

After printing, dry and dye in a lukewarm bath containing the usual constituents. After dyeing the goods are slightly scoured or soaped. To get a yellow effect, lead salts may be employed in printing the reserve and the material passed, after dyeing, through a bichromate solution.

The question has been asked, Do sulphur dyes injure the fibre? This question has been briefly answered before, but the following states more precisely the established conditions under which tendering may take place:

1. Weakening during the dyeing operation proper is out of the question, also no injuring can be proved from the use of sodium sulphide, in fact the strength is increased from 10 to 15 per cent. by the one-bath method.

2. The use of the following after-treating agents are not injurious if used according to the percentages given and the temperature not raised over 50 degrees, C., but use of larger percentages, sulphuric acid, or higher temperatures will injure the fibre:

Potassium bichromate, 2 to 3 per cent.
Bluestone, 2 to 3 per cent.
Alum, 2 to 3 per cent.
Acetic acid, 2 to 4 per cent.

3. Rotting of materials on storage has never been proved.

4. Injury may be effected by too high a temperature in calendering, pressing, steaming, etc., but colors dyed without the use of metallic salts or acid withstand high temperatures, otherwise they are subject to injury.

5. Injury due to this last cause can be prevented by treating the goods in a weak alkaline bath such as soap, soda or ammonia.

Cotton may be dyed black in either of five different manners, namely: With Direct Blacks, with logwood, with Developed Blacks, with Aniline Black and with Sulphur Blacks, and it is often desirable or necessary to distinguish between them. This may be accomplished in the following manner:

1. A Direct Black is easily disposed of by boiling in water when most of the color can be discharged.

2. A Logwood Black is recognized by boiling with dilute acid when a cherry-red is obtained on the fibre.

3. A Developed Black can be detected by boiling in sodium hydrosulphide when it is permanently decolorized, whereas both Aniline Black and Sulphur Blacks regain their color.

4. To distinguish between Sulphur Black and Aniline Black the following tests may be made:

a. Place a sample in bleaching powder solution at 4 degress, Tw., which is just under the boil. The Sulphur Black is completely bleached while the Aniline Black turns nut brown. Sulphur Black topped with Aniline Black varies from a pale yellow to brown according to the amount of Aniline Black present.

b. Boil samples in a solution of stannous chloride. Sulphur Black is changed to olive but Aniline Black is unchanged.

c. Upon boiling samples with sodium hydrosulphite both Aniline Black and Sulphur Blacks are decolorized; the Aniline Black regains its color immediately if taken from the solution but the Sulphur Black is restored more slowly.

d. If Aniline Black be moistened with sodium bisulphite it will turn green but Sulphur Blacks are unaffected by this treatment.

Thus from the preceding matter the following summary may be drawn up:

1. Sulphur colors are dyed on cotton from a bath of sodium sulphide and salt. (There are a few exceptions which substitute soda for the sulphide.)

2. Blacks must be dyed at a boil.

3. Copper vats or fixings cannot be used.

4. Wool or other animal fibres may be dyed by the use of reduced colors in an analogous manner to indigo, or by the addition of glucose to the dyebath.

5. Sulphur colors cannot be generally used in printing for the reason before given.

6. Sulphur colors are extremely fast to light, washing, milling, acid and alkalies, especially if after-treated with chrome and bluestone, but are not fast to chlorine.

7. The dyebaths should be as short as possible since the colors do not exhaust well.

The first distinct mention made of mohair fabric as an article of commerce is in 1868, when it was brought to London from Turkey.

TEXTILE PROCESSES.

EDITED BY E. A. POSSELT.

PRACTICAL POINTS ON FANCY COTTON DRESS GOODS

TWO COLOR EFFECTS.

This feature, in connection with the present system of designing, is readily explained by means of designs figs. 22 and 23; the object being to either produce certain portions of the design in one color and other portions in another, or intermixing two colors either 1:1 or 2:1 or after any similar arrangement, in either case adhering to one system of extra warp throughout the entire design, one color in its turn simply — as regulated by the design — taking the place of the other color, thus in turn not increasing the warp texture of the fabric.

Fig. 22 calls for 36 warp threads for its repeat and this in connection with 7 harness for practical work, certainly quite an elaborate design for so few harness. The drawing in draft being thus: — 1, 1, 2, 2, 3, 4, 4, 5, 5, 5, 5, 4, 6, 7, 7, 6, 4, 5, 5, 4, 6, 7, 7, 6, 4, 5, 5, 5, 5, 4, 4, 3, 2, 2, 1, 1. The dressing of this extra warp design being thus: —

13 ends color A (see ■ type)
2 " " B (" × ")
6 " " A (" ■ ")
2 " " B (" × ")
13 " " A (" ■ ")

36 ends in repeat of pattern.

Fig. 23 shows an extra warp effect in 2 colors, both colors being intermixed 1:1, i.e., one end of color A to alternate with one end of color B. Repeat of pattern 18 ends, to be woven with 18 harness straight draw.

In the same manner as having thus shown the combination of two colors, three or more colors can be combined and this without deviating from the principle of one system of extra (or figure) warp.

USING PARTLY ONE SYSTEM, PARTLY TWO SYSTEMS OF EXTRA WARP.

In the construction of the design and thus in turn practical in the loom is a texture frequently used and readily explained by means of design fig. 24 and its fabric structure weave fig. 25. Considering first design fig. 24 we find its first three rows of squares to call for one system of extra warp, rows 4, 5, 6, 7 and 8 call for two systems and rows 9, 10 and 11 in turn again for one system of extra warp only.

The dressing of the extra warp is thus: —

4 ends color A — see × type = 4 ends
1 end " B — " ■ " = 1 end
1 " " A } × 4 = 8 ends
1 " " B }
3 " " B = 3 ends

Repeat of dressing 16 ends.

Number of harness required for the execution of the design 16 harness (+ 2 or 4 harness for the ground warp). Diagram fig. 25 shows the plan of interlacing of the extra warps in connec- with the ground warp (see ⊡ type) which in the present instance interlaces with the plain cotton weave. A few ends of plain ground are shown on either side of the stripe effect in order to bring the latter more prominently up. A on top of the weave indicates the color chart for the weaver and reads thus: —

6 ends ground warp (see ⊡ type) = 6 ends
1 end figure warp color No. 1 (see × type } × 3 = 6 ends
1 " ground warp }
1 " figure warp color No. 1 (see ■ type } × 5 = 15 ends
1 " ground warp }
1 " figure warp color No 1 } × 3 = 6 ends
1 " ground warp }
5 " ground warp = 5 ends

Having thus given a thorough description of the construction of these fabrics we next show by means of figs. 26 and 27 two new designs.

Design Fig. 26 calls for

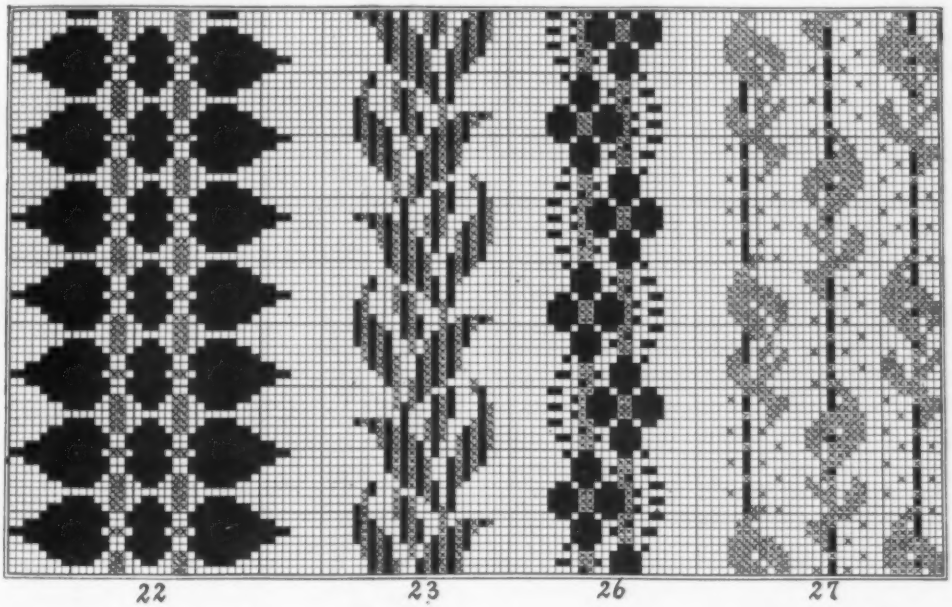
4 rows of squares — one extra warp = 4 ends
2 rows of squares — two extra warps = 4 ends
3 rows of squares — one extra warp = 3 ends
2 rows of squares — two extra warps = 4 ends
4 rows of squares — one extra warp = 4 ends

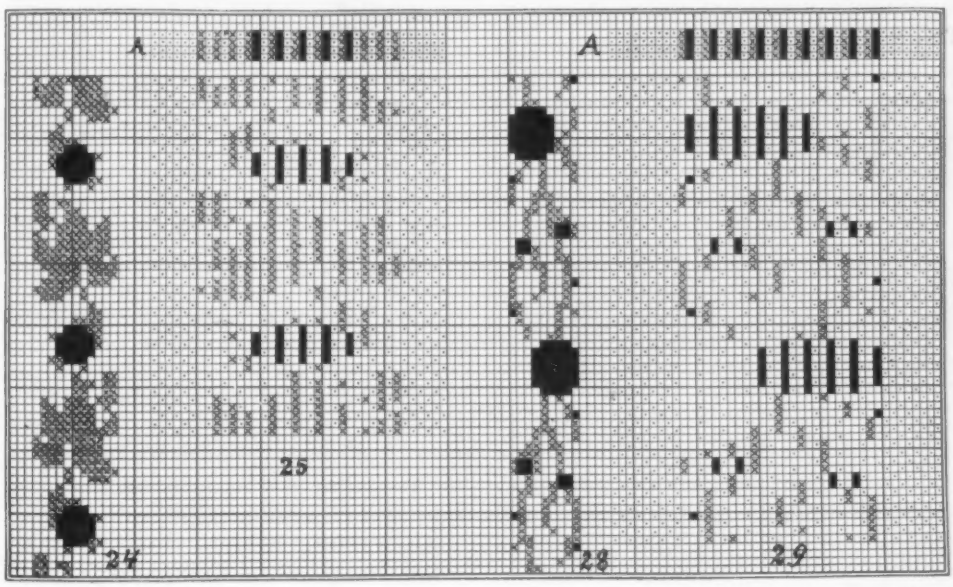
Repeat of pattern 19 ends

for ground structure use (best) plain weave although small granite weaves may be substituted for it.

Design Fig. 27 is what we may term a very novel effect having in its repeat only 3 ends of additional (No. 2) extra or figure warp. The complete design consists in the proper combination of three small stripes of which the two

outside situated ones (1 and 3) correspond with the only exception of the placing of the extra colored thread which in this instance is changed in its position, a feature which increases the fancy effect of the design in a general way, since by me-ns of it the complete design seems composed of 3 different single stripes the displacing of the extra colored thread (see ■ type), being the sole cause of this affair.





Repeat of pattern (considering the fancy effect only) 24 warp threads of extra warp No. 1, see × type and 3 warp threads of extra warp

No. 2, see ■ type. Harness required 16 harness for weaving warp threads indicated by × type and 3 harness for interlacing those indicated by ■ type; thus complete number of harness required for weaving the complete fancy stripe effect 19 (+ 2 (or more) harness for weaving the ground structure of the fabric).

USING THREE SYSTEMS OF WARP.

This affair is readily explained by means of design fig. 28 and diagram fig. 29.

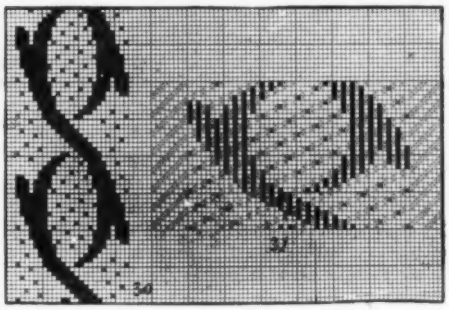
Design fig. 28 repeats on 9 rows of warp squares calling for $2 \times 9 = 18$ threads of extra warp.

Diagram fig. 29 shows the analysis of a fabric to be woven in connection with design fig. 28, having its ground structure interlaced with the common plain weave. A few ends plain ground structure being shown at either side of the stripe effect. A on top of diagram indicates the dressing, i.e., color scheme for the warp thus: —

9 ends ground warp (⊡ type)		= 9 ends
1 end figure warp, shade No. 1 (× type) 1 end figure warp, shade No. 2 (■ type)	× 9	= 27 ends
1 end ground warp 7 ends ground warp		= 7 ends

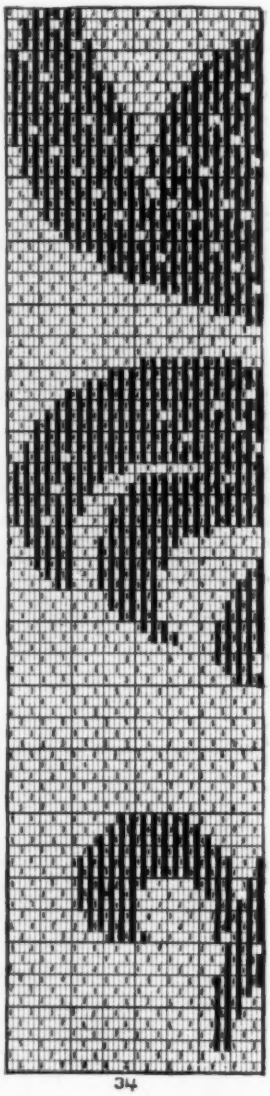
STITCHING THE FIGURE WARP WHEN FLOATING ON BACK OF FABRIC, NOT VISIBLE TO THE LATTER.

This feature is readily explained by means of design fig. 30 and weave plan of fabric fig. 31.



Design fig. 30 repeat 25 warp threads ■ type indicates the places where the figure warp floats on face of the fabric, × showing the places where said figure warp when floating on back of structure stitches to the latter and this always in places where 2 ground warp threads are up — one on either side of the extra warp, a feature readily explained by means of fabric plan fig. 31. The weave used for interlacing the

32



34

ground structure is the $\frac{2}{2}$ 4 harness 45° twill, and the weave used for stitching the floating figure warp to the back of the fabric, the 8 leaf satin $\frac{1}{7}$. Number of harness required to weave the fabric 29.

JACQUARD EFFECTS.

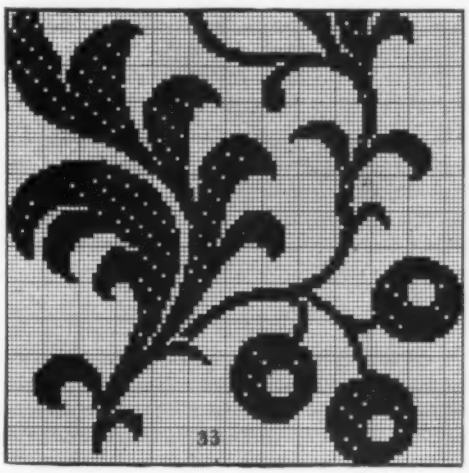
One example will be sufficient to explain the procedure.

Fig. 32 shows a fabric sketch for a fancy cotton (or other material) dress good.

Fig. 33 shows the lower portion of said sketch

executed on point paper, calling for 100 warp threads for repeat of pattern. ■ = warp up.

Diagram fig. 34 shows a portion of design fig. 33 as its warp threads will interlace with the ground structure as is interlacing with the plain weave. With reference to the tie-up of



the Jacquard harness for weaving these extra warp dress goods, stripes as well as all-over patterns, and which are constructed on the same principle, the reader is referred to the series of articles on tying up Jacquard harnesses as appearing simultaneously in the columns of this journal.

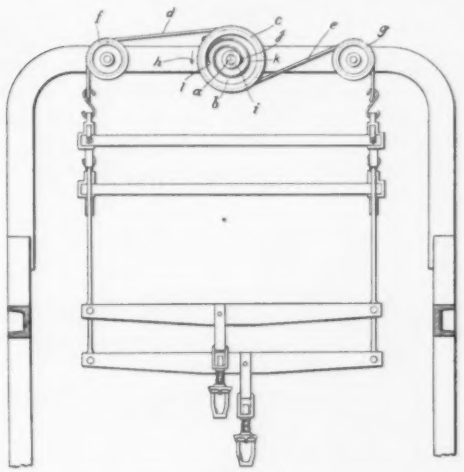
HARNESS RETRACTOR FOR DRAPER LOOMS.

The new device refers to that class of looms wherein the harness frames are moved positively in the lower portion of the shed by means of cams, and raised in the upper portion of the shed by means of spring-actuated drum winding. Two or more harness frames can be used, as the movement of each is effected independently of the others.

The accompanying illustration shows the gist of the new device—the spring actuated drum winding mechanism, i.e., harness retractor device—in its front elevation, so much of portions of loom being shown in connection with it as are required to get a clear understanding of the working of the new mechanism.

In this class of looms, the harness frames are depressed (pulled down) by means of harness cams (not shown in illustration).

The arch of the loom sustains a horizontal stud, a, and projecting forwardly therefrom, and on said stud is mounted a plurality of spring operated rotatable actuators, one for each harness frame. Each actuator is made as a circular disk, b, having an overhanging annular flange, c, externally grooved, the disk having a hub to be supported rotatably on the stud, a, the actuator being substantially an externally grooved drum. These drums are mounted upon the stud, one in front of the other, above their respective harness frames, and flexible straps, d e, are wound from opposite directions above the groomed periphery of each drum and secured thereto, their other ends being led over guide rollers, f g,



and in turn attached to the harness frames.

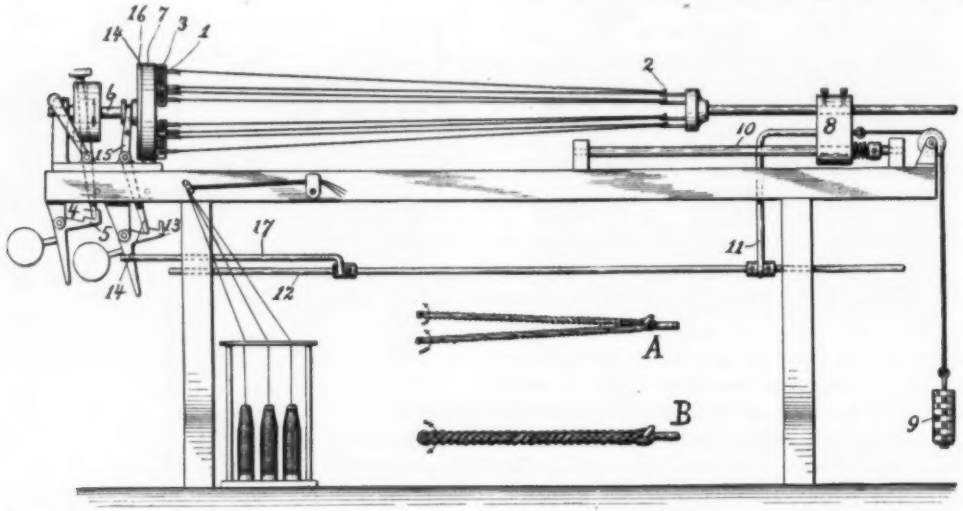
When the drum is rotated in the direction of arrow, h, the connection, d e, will be unwound, and the harness frame attached thereto lowered, opposite rotation of the drum winding up the connections and lifting the harness frame. A collar, i, is secured to the stud, a, within each drum in front of the disk, b, thereof, and by a suitable set screw, j, one end of a coiled spring, k, is fixed to the collar, the spring, of the flat or clock spring type, being coiled about the collar and having its other end secured at l to the inner circumference of the flange, c.

When each harness frame is depressed pos-

itively by its cam (not shown), the drum of said frame will be rotated in the direction of arrow, h, and its spring thus wound, storing up its power. As the cam rotates and in turn releases the down pull on the harness frame, the spring, k, of its drum expands, turning the drum oppositely to the arrow, h, and thereby winding upon its periphery the connections, d e, i.e., lifting the harness frame. Any stretch of the flexible connections, d e, is taken up by the springs; and the opposite winding of each pair of connections effects an even and uniform movement to the harness frame.

HOW THE LOOP BANDS AS USED FOR DRIVING THE SPINDLES OF SPINNING AND TWISTING MACHINES, ETC., ARE MADE.

Such bands are composed of cotton cord or yarn suitably twisted and doubled to form a loop at one end of the band by which the securing of the banding on the machine, where required to be used, is greatly facilitated.



The manufacture of these bands is done by means of loop banding machines, of which a modern make is shown in the accompanying illustration. It is organized to twist and double a number of the loop bands at one operation, and is claimed to be the first machine of its kind constructed in which two or more bands can be made simultaneously.

In the illustration of this banding machine (a side view of it), its length is somewhat reduced to show the relative proportions of the parts more clearly within a limited space. Detail illustrations A and B are given to show more clearly the formation of the loop band, viz: A illustrates the operation of twisting the two strands of cord or yarn, and B the doubling of the banding.

The operation of the machine is thus: The machine having been adjusted to twist and double loop—banding of the desired length, the operator secures the desired number of coarse threads to one of the twister hooks 1, then hooks the same threads over the corresponding loop hook 2, and secures the other ends of the threads to the other twister hook 1. Having thus formed one loop, the ends of which are fastened to the two twister hooks of the same frame 3, the operator proceeds to secure in the same manner the other (five in this instance) strands of thread to the twister hooks of the other (five in this instance) twister frames. The operator now starts the machine by moving the belt from the loose to the tight pulley, at the same time moving the arm 4 one notch on the bell crank lever 5. The power transmitted through the shaft 6 and the gear, a gear (not shown) which engages with the series of gears each of which is secured to short staffs as jour-

naled in standard 7 communicated to the (six pairs in the present machine) twister hooks 1 through suitable gears and pinions in each of the twister frames, thereby twisting twelve strands in the machine simultaneously.

The twisting of these strands (see diagram A) acts to contract the same and draws the block 8 and the weight 9 toward the head stock. The block 8 is moved thereby on the rods 10, and this motion is transmitted through the rod 11 to the rod 12 until the end of the rod 12 engages with the bell crank lever 13 and knocks off the arm 14, when a spring (not shown) acts through the lever 15 to draw back the disk 16 and withdraw the pins as fast to the disk out of the way of the twister frames 3, thereby permitting the rotation of the twister frames 3 and the doubling of each of the pairs of strands into one band (see diagram B). The doubling of the bands continues to draw the block 8 forward until the end of the rod 17 engages with the bell crank lever 5 to knock off the shipper and stop the machine, when the operator removes the twisted and doubled loop banding from the machine and repeats the operation.

THE PRINCIPLE OF DRAWING IN COTTON SPINNING.

The object of drawing is to gradually elongate the sliver until the proper amount of attenuation is obtained for the respective counts of yarn to be spun. Commencing with the back rollers, each set of rollers revolves at a gradually increasing speed, the front roller having the greatest velocity, and the back roller the least, and thus the rollers are enabled to draw the sliver to the desired weight, length, or bulk that is considered sufficient for that particular operation; by simply repeating this drawing process, the sliver being always drawn out finer. To draw the same sliver repeatedly without doubling it with another one would cause the original imperfections to be increased at every repetition, therefore, the separate slivers on leaving the card engines are made to undergo a doubling process, by taking a given number of them and combining them into one at the calender roller of the drawing frame. Good fibres in this instance help to support and strengthen weaker ones. These slivers, when ready for spinning, are called rovings.

CORKSCREW WEAVES; THEIR CONSTRUCTION RND RPPLICATION TO WORSTED TROUSERINGS, COATINGS AND SUITINGS.

(Continued from June.)

Several of the figures referred to are in the June number.

Weave Fig. 26 shows six pieces of the 8-harness corkscrew, see ■ and ⊡ type, as obtained from the $\frac{4}{4}$ 45° twill (see Fig. 14 for its construction) in connection with five pieces of warp rib effect, see × type, and one piece filling rib effect; see also × type arranged for the construction of a

FANCY WORSTED TROUSERING.

Repeat of the complete weave 108 × 8. Texture for fabric to be thus:

Warp:—6,324 ends, 17-harness (or more) fancy draw.
Reed:—17 × 6 = 62 inches wide in loom.
Dress:—

6 ends, 2/56's worsted, medium	= 6 ends.
1 end, 2/56's worsted, dark	× 6 = 12 ends.
1 end, 2/56's worsted, light	
1 end, 2/56's worsted, dark	
1 end, 2/56's worsted, light	× 2 = 6 ends.
1 end, 2/56's worsted, dark	
1 end, 2/56's worsted, dark	× 6 = 12 ends.
1 end, 2/56's worsted, light	
6 ends, 2/56's worsted, dark and light twist	= 6 ends.
1 end, 2/56's worsted, dark	× 6 = 12 ends.
1 end, 2/56's worsted, light	
1 end, silk, 17,500 yards, light	= 1 end.
1 end, 2/56's worsted, dark	= 1 end.
2 ends, silk, 17,500 yards, light	= 2 ends.
1 end, 2/56's worsted, dark	= 1 end.
1 end, silk, 17,500 yards, light	= 1 end.
1 end, 2/56's worsted, dark	× 6 = 12 ends.
1 end, 2/56's worsted, light	
6 ends, 2/56's worsted, dark and light twist	= 6 ends.
1 end, 2/56's worsted, dark	× 6 = 12 ends.
1 end, 2/56's worsted, light	
1 end, 2/56's worsted, dark	
1 end, 2/56's worsted, light	× 3 = 6 ends.
1 end, 2/56's worsted, dark	
1 end, 2/56's worsted, dark	× 6 = 12 ends.
1 end, 2/56's worsted, light	
Repeat of pattern:	108 ends.

Filling:—90 picks per inch, all 2/56's worsted, medium shade.
Finish:—Worsted finish; 56 inches wide.

Weave Fig. 27 is a fancy corkscrew, derived by combining the $\frac{5}{4}$ with the $\frac{6}{3}$ 9-harness 45° twill, forming two effects, viz.:

(a) *Regular* corkscrew (see ■ and ⊡ type), for 18-warp threads.

(b) *Pointed* steep corkscrew sections (see ■ and × type) for the remainder of the repeat of the weave.

Repeat of the complete weave, 180 warp-

threads and 9 picks. With reference to texture the following example of a

FANCY WORSTED TROUSERING

will readily explain the subject.

Warp:—6,720 ends, 18-harness fancy draw.
Reed:—17½ × 6 = 64 inches wide in loom.
Dress:—

1 end, 2/50's worsted, dark.....
1 end, 2-ply silk @ 37,500 lively .....
} × 9 = 18 ends.

1 end, 2/50's worsted, dark.....
1 end, 2/50's worsted, light .....
} × 36 = 72 ends.

1 end 2/50's worsted, dark, twists over with silk @ 37,500, lively shade No. 1....
} = 1 end.

1 end, 2/50's worsted, light..... = 1 end.

1 end, 2/50's worsted, dark, twisted over with silk @ 37,500, lively shade No. 2.....
1 end, 2/50's worsted, light.....
1 end, 2/50's worsted, dark, twisted over with silk @ 37,500, lively shade No. 1.....
1 end, 2/50's worsted, light.....
} × 4 = 16 ends.

1 end, 2/50's worsted, dark.....
1 end, 2/50's worsted, light.....
} × 36 = 72 ends.

Repeat of pattern: 180 ends.

Filling:—92 picks per inch, all 2/50's worsted, ligh shade.

Finish:—Worsted finish ; 56 inches finished width.

Weave Fig. 28 shows a wavy-figured corkscrew; repeating on 360 × 36, originally constructed with reference to a

WORSTED TROUSERING,

executed thus : —

Warp:—8,448 ends, 36-harness fancy draw.
Reed:—22 × 6 = 64 inches wide in loom.
Dress:—

2 ends, 2/50's worsted, dark..... = 2 ends.
1 end, 2/50's worsted, light.....
1 end, 2/50's worsted, dark .....
} × 81 = 162 ends.

1 end, silk @ 17,500 yards, lively ....
1 end, 2/50's worsted, dark .....
} × 7 = 14 ends.

2 ends, 2/50's worsted, dark..... = 2 ends.

Repeat of pattern: 180 ends.

Filling:—78 picks per inch, all 2/50's worsted, dark shade.

Finish:—Worsted finish ; 56 inches wide.

Weave Fig. 29 shows 2 kinds of filling effect corkscrews (either one having the $\frac{4}{4}$ 8-harness 45° twill for their foundation), separated by means of a 6-end warp-rib fabric (plain weave face), see × type. The first corkscrew effect shows a regular filling-effect twill line "over 4 warp threads" for 80 ends, whereas the other corkscrew effect shows a diagonal filling spotted effect for 72 ends; the complete repeat of the weave being 164 warp threads and 72 picks. Its application to a

FANCY WORSTED TROUSERING

is best quoted thus : —

Warp:—6,336 ends, 28-harness fancy draw.
Reed:—16½ × 6 = 64 inches wide in loom.
Dress:—

2 ends, 2/60's worsted, medium..... = 2 ends
2 ends, silk @ 50,000 yards, lively..... = 2 ends.
2 ends, 2/60's worsted, medium..... = 2 ends.

1 end, 2/60's worsted, light.....
1 end, 2/60's worsted, medium.....
} × 3 = 6 ends.

1 end, 2/60's worsted, dark....
1 end, 2/60's worsted, light...
} × 2 = 4 ends

1 end, 2/60's worsted, light...
1 end, 2/60's worsted, medium
} × 6 = 12 ends

} × 4 = 64 ends.

1 end, 2/60's worsted, dark .....
1 end, 2/60's worsted, light .....
} × 2 = 4 ends.

1 end, 2/60's worsted, light .....
1 end, 2/60's worsted, medium.....
} × 3 = 6 ends.

2 ends, 2/60's worsted, medium..... = 2 ends.
2 ends, silk @ 50,000 yards, lively ..... = 2 ends.
2 ends, 2/60's worsted, medium..... = 2 ends.

1 end, 2/60's worsted, light.....
1 end, 2/60's worsted, medium.....
} × 36 = 72 ends.

Repeat of pattern: 164 ends.

Filling:—92 picks per inch, arranged thus :

2 picks, 2/60's worsted, light.
2 picks, 2/60's worsted, dark.

4 picks in repeat of pattern.

Finish:—Worsted finish, 56 inches wide.

Weave Fig. 30 shows another combination of two, filling effect, corkscrew weaves, viz. :

Sixteen warp threads, regular filling twill, having the $\frac{5}{7}$ 12-harness 45° twill for their foundation and 96 warp threads filling spotting upon a corkscrew constructed from the $\frac{5}{7}$ and $\frac{2}{3}$ 12-harness 45° twills. Repeat of weave 112 × 96. Its application to a

FANCY WORSTED TROUSERING

would be thus : —

Warp:—6,336 ends, 24-harness fancy draw.
Reed:—16 × 6 = 66 inches wide in loom.
Dress:—

1 end, 2/44's worsted, dark.....
1 end, 2/44's worsted, light.....
} × 3 = 6 ends.

1 end, 2/44's worsted, dark ..... = 1 end.
1 end, silk @ 37,500 yards, per lb , lively..... = 1 end.
1 end, 2/44's worsted, lively..... = 1 end.
1 end, silk @ 37,500 yards, per lb., lively..... = 1 end.
1 end, 2/44's worsted, dark ..... = 1 end.

1 end, 2/44's worsted, light.....
1 end, 2/44's worsted, dark .....
} × 12 = 24 ends.

1 end, silk @ 37,500 yards, per lb., lively..... = 1 end.
1 end, 2/44's worsted, light..... = 1 end.
1 end, silk @ 37,500 yards, per lb., lively..... = 1 end.

1 end, 2/44's worsted, dark .....
1 end, 2/44's worsted, light .....
} × 37 = 74 ends.

Repeat of pattern: 112 ends.

Filling:—95 picks per inch, arranged thus :

3 picks, 2/44's worsted, light.
3 picks, 2/44's worsted, dark.

6 picks in repeat of pattern.

Finish:—Worsted finish, 56 inches wide.

Another popular style of cloth using a corkscrew weave for their interlacing, is

COVERT CLOTH,

the same calling for the regular 5-harness corkscrew as shown in Fig. 1. They are woolen fabrics, good constructions with reference to a 54-inch-wide fabric being : —

Warp:—3,200 ends, 10-harness straight draw; all 2-ply, 6-run twist (white and olive drab for example).

Reed:—11½ × 4 = 71 inches wide in reed.
Filling:—46 picks per inch, all 5½-run woolen yarn, olive drab.

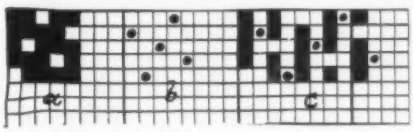
A lower (cheaper) texture for fabrics in question is thus:

Warp:—2,600 ends, 10-harness straight draw; all 2-ply, 5½-run twist.
Reed:—12 × 3 = 72 inches wide in reed.
Filling:—45 picks per inch, all 4½-run woolen yarn.

Some of the last foreign styles, with reference to covert cloth, show pointed corkscrews; a novel effect in this line showing 30 / 30 \; dressed, 59 ends olive and drab twist to alternate with 1 end dark green. Filling, all olive. In some instances corkscrews require

AN ADDITIONAL BACKWARP ADDED,

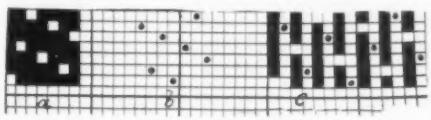
in order to increase the bulk of the structure. Although the affair occurs only in exceptional instances, it will be of interest to show the procedure with two examples.



31

Weave Fig. 31 shows the five-harness corkscrew thus treated:

a = face weave by itself.
b = back weave by itself.
c = complete weave, repeat 10 × 5.
Face weave = 5-harness corkscrew, see ■ type.
Back weave = 5-leaf satin, see ⊡ type.



32

Weave Fig. 32 shows the seven-harness corkscrew treated in the same manner as thus dealt with the five-harness, the weave for the back warp being the 7-leaf satin; see ⊡ type.

LESSON.

Question 1. Construct a regular corkscrew from the $^{2}{}_{3}$ 5-harness 45° twill.

Question 2. Construct a regular corkscrew from the $^{6}{}_{2}{}^{1}{}_{1}$ 11-harness 45° twill.

Question 3. Construct a corkscrew showing also filling twill effect from the $^{5}{}_{6}$ 11-harness 45° twill.

Question 4. Show filling spotting, having the 4-harness broken twill for motive of setting spots upon the 7-harness ($^{4}{}_{3}$) regular cork screw. Repeat of weave to be 28 × 28.

Question 5. Show filling spotting having the 5-leaf satin for motive for setting spots upon the 5-harness ($^{3}{}_{2}$) regular corkscrew. Repeat of weave to be 25 × 25.

Question 6. Show filling spotting having the plain weave for motive for setting spots upon the 11-harness ($^{4}{}_{2}{}^{3}{}_{2}$) regular corkscrew (see Fig. 8). Repeat of weave to be 44 × 44. (Consider every other repeat of the weave only in setting spots.)

Question 7. Produce a curved corkscrew with the $^{3}{}_{2}$ 5-harness 45° for its foundation.

Question 8. Produce a figured corkscrew to weave on 24 or less harness.

Question 9. Combine 13 warp threads of the $^{5}{}_{2}{}^{4}{}_{2}$ 13-harness (see Fig. 9) corkscrew with 2 repeats of the $^{1}{}_{5}$ 6-leaf satin for a worsted trousering, stripe effect (piece dyed). Repeat of weave 25 × 78.

Question 10. What is the difference in its construction and application to woven fabrics between a corkscrew and a regular 45° twill?

Question 11. Produce a 3-colored warp-effect (triple twill lines) corkscrew.

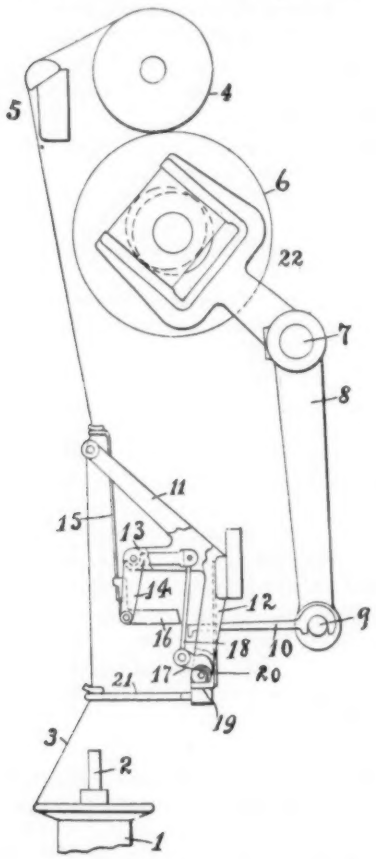
Question: Add an extra back warp to the $^{4}{}_{2}{}^{3}{}_{2}$ 11-harness (see Fig. 8) corkscrew in order to increase bulk of structure.

A NOVEL STOP MOTION FOR SILK SPINNING FRAMES.

The object is to provide a device positive in operation, responding quickly upon the breaking of a thread and preserving an even tension upon the threads being wound, the device providing means whereby the supply of the thread being wound is cut off, rather than by the stopping of any of the running parts of the machinery. The new device is especially applicable to the twisting and doubling of silk threads at a single operation, it being necessary to preserve an equal tension upon each of the threads wound upon the bobbin, and refers more particularly to spinning frames where the tension is obtained only by revolving the spindles at an extremely high rate of speed.

The accompanying illustration shows the new device, at the same time showing those portions of a spinning frame to which the same more particularly refers.

A description of the working of the new



device is best given by means of quoting numerals of reference accompanying said illustration of which 1 indicates one of the supply bobbins as mounted on the blade of a spindle, 2, and from which the silk thread, 3, is supplied to the bobbin, 4, upon which it is wound, the thread passing through the thread guide, 5. An eccentric, 22, is borne on the shaft extending lengthwise of the machine and a cylinder, 6, is also secured to the shaft in operative relation to the bobbin, 4, that receives motion therefrom by frictional contact. This eccentric is operatively connected to a bell-crank lever, 8, mounted on a pivot, 7, the opposite end of the lever bearing a stud, 9, to which is connected a drag, 10. A frame consisting of upward projecting side parts, 11, downward projecting side parts, 12, and forward projecting side parts, 13, is mounted underneath the bobbin, 4. A trip-lever, 14, is pivoted between the forward projecting side parts, 13, and a drop wire, 15, appurtenant to each spindle in the group, is pivoted on said lever. Each drop wire is secured to a foot 16, projecting therefrom at an angle, the weight of this foot being sufficient to swing each of the drop wires backward when not supported in an upright position. A rocking lever, 17, is pivoted between the downward projecting side parts, 12, of the frame and is connected by a link, 18, with the trip lever, 14. This rocking lever, 17, is provided with cam surfaces, 19, each located at an angle with the other, and a spring, 20, secured to the frame, bears against these cam surfaces. Thread engaging arms, 21, project forward from the rocking lever in a position to engage the threads from the supply bobbin, one of these arms being provided appurtenant to each spindle from which thread is being supplied. The spring, 20, is provided for the purpose of causing the rocking lever, 17, to operate with some force after a certain degree of movement has been imparted to the device by means of engagement of the drag, 10, with a foot, 16, the spring bearing with considerable force against one or the other flat cam surfaces, 19, and causing rotation of the parts under the impulse of the spring after the drag has ceased to operate thereon.

THE OPERATION OF THE DEVICE IS AS FOLLOWS:

The parts being in the relative position shown in the illustration, with the thread, 3, projecting upward through the eyelets in the thread-engaging arms, 21, and in engagement with the ends of the drop wires, 15, as the drag, 10, is reciprocated by the eccentric, 22, the drag escapes contact with the foot portion, 16, of the drop wire.

When a thread breaks for any reason, the drop wire is tipped backward by the weight of the foot, 16, into the path movement of the drag, 10, the drop wire engaging a fixed stop on the tension lever. As the drag encounters

the foot of the drop wire the trip lever is rocked on its pivot, and, through means of connecting link, 18, throws the thread-engaging arms, 21, on the rocking lever, 17, downward and backward, which movement is accelerated as the spring, 20, comes in contact with the next cam surface on the rocking lever. This breaks the remaining thread or threads from the group of spindles, and the ends are immediately wound upon the bobbin, 4, until such time as the operative shall take up the ends and start the machine in operation.

CONTRACTION IN COTTON CLOTH.

If the fibres consisting of warp and filling were inelastic and incompressible, there might be a possibility of formulating a set of rules governing the percentage of contraction in different fabrics, but practical manufacturers will readily understand how futile it is to lay down any fixed basis. Certainly with the staple fabrics a mill is making it is possible for them to make a formula giving a very close approximation of the shrinkage, even with slight changes in styles.

In order to show that no fast rules on this subject can be laid down, let us take an ordinary cotton thread, supposed to contain the full number of twists per inch, got by the square root of its count, multiplied by 3.75 or 3.25 according to twist; then we have to take note of its oozy character and what its probable diameter will be, at every intersection, when subjected to the strain in weaving. This, however, might be determined with some degree of accuracy, but we are met with the unknown, in the shape of size, which may be anything, ranging from 25 to 200 per cent., and thus the diameter of the warp threads is increased, and, besides, the more size composition the more rigid and unbending of the yarns in intersecting, especially in plain weaves; the filling must then give way and the bulk of the shrinkage is in the filling. The resistance to bending of round materials is inversely as the square of the distance between their places of support, and directly as the square of their diameters. This is a mathematical theorem advanced as applicable to textile fibres, on the supposition that they are dense, unyielding bodies, when we know the contrary to be the fact. A warp and filling all of wire might follow the rule, but cotton, wool, worsted and silk cannot be gauged by any such means. One evil in connection with the manufacture of plain goods requiring a smooth face and good soft feel to the hand of the buyers, is having too much twist in the materials,—this does not increase the strength of the yarn, as many are led to suppose, but is really a source of weakness, as a hard twisted, wiry thread in calico goods cannot be made to produce a soft velvety cloth, equal to that which has a minimum of strength, with the least possible amount of twist. With this class of yarns, in any open reed, two in a dent, and a good "cover" put on, the fabric would appear as if woven in a far finer reed.

NOVELTIES FROM FOREIGN SOURCES.

Worsted Suiting (Small check).

Complete Weave.
Repeat 2 × 2.

Warp:—4,555 ends, 16 harness straight draw.
Reed:—17 1/2 × 4 = 64 3/4 wide in loom.
Dress:—

5 ends, 2/52's worsted, black	= 5 ends.
1 end, 2/52's worsted, black and pearl twist	= 1 end
1 end, 2/52's worsted, black	= 1 end.
1 end, 2/52's worsted, black and pearl twist	= 1 end.
5 ends, 2/52's worsted, black	= 5 ends.
1 end, 2/52's worsted, black and pearl twist	= 1 end.
1 end, 2/52's worsted, black	= 1 end.
1 end, 2/60's, cotton, pearl	= 1 end.

Repeat of pattern: 16 ends.

Filling:—66 picks per inch, same yarn and arranged as used in warp.
Finish:—Worsted finish, 56 inches wide.

Cheviot Suiting.

Complete Weave.
Repeat 4 × 4.

Warp:—2,365 ends, 8 or 12 harness straight draw.
Reed:—17 1/2 × 2 = 67 1/2 inches wide in loom.
Dress:—

1 end, 2 ply 6 1/2 run woolen yarn, black	= 1 end.
1 end, single 4 run woolen yarn, white	= 1 end.
3 ends, 2 ply 6 1/2 run woolen yarn, black and pearl twist	= 3 ends.
1 end, single 4 run woolen yarn, white	= 1 end.
1 end, 2 ply 6 1/2 run woolen yarn, black	= 1 end.
1 end, single 4 run woolen yarn, white	= 1 end.
2 ends, 2 ply 6 1/2 run woolen yarn, black and pearl twist	= 2 ends.
1 end, 2/36's black worsted cheviot twisted with 2/40's cotton, white	= 1 end.
1 end, single 4 run woolen yarn, white	= 1 end.

Repeat of pattern: 12 ends.

Filling:—47 picks per inch, all 2/36's black worsted cheviot.
Finish:—Cheviot finish, 56 inches wide.

Worsted Suiting.

Complete Weave.
Repeat 4 × 4.

Warp:—4,160 ends, 12 to 16-harness straight draw.
Reed:—16 1/2 × 4 = 66 inches wide in loom.
Dress:—

1 end, 2/42's worsted, white and green drab twist.... = 1 end.
3 ends, 2/42's worsted, brown..... = 3 ends.
1 end, 2/42's worsted, white and green drab twist.... = 1 end.
1 end, 2/42's worsted, brown..... × 2 = 4 ends.
1 end, 2/42's worsted, drab and olive twist.....
3 ends, 2/42's worsted, brown..... = 3 ends.
1 end, 2/42's worsted, drab and olive twist..... × 2 = 4 ends.
1 end, 2/42's worsted, brown.....
1 end, 2/42's worsted, white and green drab twist.... = 1 end.
3 ends, 2/42's worsted, brown..... = 3 ends.
1 end, 2/42's worsted, white and green drab twist.... = 1 end.
1 end, 2/42's worsted, brown..... × 2 = 4 ends.
1 end, 2/42's worsted, drab and olive twist.....
2 ends, 2/42's worsted, brown..... = 2 ends.
1 end, 2/52,s worsted, blue..... = 1 end.
1 end, 2/42's worsted, drab and olive twist..... × 2 = 4 ends.
1 end, 2/42's worsted, brown.....
1 end, 2/42's worsted, white and green drab twist.... = 1 end.
3 ends, 2/42's worsted, brown..... = 3 ends.
1 end, 2/42's worsted, white and green drab twist.... = 1 end.
1 end, 2/42's worsted, brown..... × 2 = 4 ends.
1 end, 2/42's worsted, drab and olive twist.....
3 ends, 2/42's worsted, brown..... = 3 ends.
1 end, 2/42's worsted, drab and olive twist..... × 2 = 4 ends.
1 end, 2/42's worsted, brown.....
1 end, 2/42's worsted, white and green drab twist.... = 1 end.
3 ends, 2/42's worsted, brown..... = 3 ends.
1 end, 2/42's worsted, white and green drab twist.... = 1 end.
1 end, 2/42's worsted, brown..... × 2 = 4 ends.
1 end, 2/42's worsted, drab and olive twist.....
2 ends, 2/42's worsted, brown..... = 2 ends.
1 end, 2/52's worsted, black and orange twist..... = 1 end.
1 end, 2/42's worsted, drab and olive twist..... × 2 = 4 ends.
1 end, 2/42's worsted, brown.....

Repeat of pattern: 64 ends

Filling:—62 picks per inch, arranged thus:

1 pick, 2/42's worsted, drab and brown twist.
1 pick, 2/42's worsted, brown.

2 picks, Repeat of pattern.

Finish:—Worsted finish, 56 inches wide.

Fancy Worsted Trousering.

Complete Weave. Repeat 67 × 8.

Warp:—8,022 ends, 20 harness fancy draw.

Reed:—20× { 3 dents & 6 ends / 1 dent & 7 ends / 7 dents & 6 ends } = 65 inches wide in loom.

Dress:—

4 ends, 2/64's worsted, pearl and black twist..... = 4 ends.
4 ends, 2/64's worsted, black..... = 4 ends.
2 ends, 2/64's worsted, pearl and black twist..... × 4 = 16 ends.
2 ends, 2/64's worsted, black.....
4 ends, 2/64's worsted, pearl and black twist..... = 4 ends.
4 ends, 2/64's worsted, black..... = 4 ends.
4 ends, 2/64's worsted, pearl and black twist..... = 4 ends.
3 ends, 2/64's worsted, black..... = 3 ends.
1 end, 2/64's worsted, pearl and black twist..... = 1 end.
2 ends, 2/64's worsted, black..... × 4 = 16 ends.
2 ends, 2/64's worsted, pearl and black twist.....
1 end, 2/64's worsted, black..... = 1 end.
2 ends, 2/64's worsted, pearl and black twist..... = 2 ends.
1 end, 2/64's worsted, black..... = 1 end.
1 end, 2/64's worsted, black and pearl twist..... = 1 end.
6 ends, 2/64's worsted, black..... = 6 ends.

Repeat of pattern: 67 ends.

Filling:—72 picks per inch, all plain 2/52's black worsted.

Finish:—Worsted finish, scour well, shear clear on face, 56 inches finished width.

Woolen Melton Suiting.

Complete Weave.
Repeat 2 × 2.

Warp:—1,728 ends, 8 harness straight draw.
Reed:—12 1/2 × 2 = 68 1/2 inches wide in loom.
Dress:—

1 end, 4 run woolen yarn, pearl.....
1 end, 2 ply 6 run woolen yarn, drab and pearl twist.....
2 ends, 2 ply 6 run woolen yarn, black and white twist.....
2 ends, 2 ply 6 run woolen yarn, drab and black twist..... × 6 = 50 ends
1 end, 4 run woolen yarn, black.....
1 end, 2 ply 6 run woolen yarn, black and white twist.....
2 ends, 2 ply 6 run woolen yarn, drab and black twist.....
1 end, 4 run woolen yarn, pearl..... = 1 end.
1 end, 2 ply 6 run woolen yarn, drab and black twist. = 1 end.
2 ends, 2 ply 6 run woolen yarn, black and white twist = 2 ends.
1 end, 2 ply 6 run woolen yarn, black and red twist.. = 1 end.
1 end, 2 ply 6 run woolen yarn, drab and black twist. = 1 end.
1 end, 4 run woolen yarn, black..... = 1 end.
1 end, 2 ply 6 run woolen yarn, black and white twist = 1 end.
2 ends, 2 ply 6 run woolen yarn, drab and black twist. = 2 ends.

Repeat of pattern: 70 ends.

Filling:—32 picks per inch, arranged thus:

1 pick, 2 ply 6 run woolen yarn black and moss green twist.....
7 picks, 4 run woolen yarn, black..... × 8 = 64 picks.
1 pick, 2 ply 6 run woolen yarn, black and moss green twist..... = 1 pick.
4 picks, 4 run woolen yarn, black..... = 4 picks.
1 pick, 2 ply 6 run woolen yarn, black and red twist..... = 1 pick.
2 picks, 4 run woolen yarn, black..... = 2 picks.

Repeat of pattern: 72 picks.

Finish:—Melton finish, scour well, full slightly, clip on shear, 56 inches wide.

Worsted Suiting (Stripe effect).

Complete Weave.
Repeat 6 × 6.

Warp:—4,440 ends, 12-harness straight draw.
Reed:—22 1/2 × 3 = 65 1/2 inches wide in loom.
Dress:—

1 end, 70/2's white silk.....
2 ends, 2/40's worsted, black.....
1 end, 2/40's worsted, black and blue twist.....
2 ends, 2/40's worsted, black.....
1 end, 2/40's worsted, black and white twist.....
2 ends, 2/40's worsted, black.....
1 end, 2/52's worsted, black and red twist..... × 2 = 36 ends.
2 ends, 2/40's worsted, black.....
1 end, 2/40's worsted, black and white twist.....
2 ends, 2/40's worsted, black.....
1 end, 2/40's worsted, black and blue twist.....
2 ends, 2/40's worsted, black.....
1 end, 70/2's white silk..... = 1 end.
2 ends, 2/40's worsted, black..... = 2 ends.
1 end, 2/40's worsted, black and blue twist..... = 1 end.
2 ends, 2/40's worsted, black..... = 2 ends.

Repeat of pattern: 42 ends.

Filling:—70 picks per inch, arranged thus:

5 picks, 2/40's worsted black.
1 pick, 2/40's worsted black and white twist.

6 picks in repeat of pattern.

Finish:—Worsted finish, 56 inches wide.

Worsted Trouserings.

Complete Weave.
Repeat 4×4.

Warp:—4,250 ends, 12 to 16-harness straight draw.

Reed:—16 1/2 × 4 = 66 inches wide in loom.

Dress:—

1 end, 140/2's white Chappé silk = 1 end.
1 end, 2/64's worsted, red = 1 end.
1 end, 140/2's white Chappé silk = 1 end.
4 ends, 2/52's worsted, drab = 4 ends.
1 end, 2/52's worsted, white and brown twist
1 end, 2/52's worsted, drab
1 end, 2/52's worsted, white
1 end, 2/52's worsted, drab } × 3 = 12 ends.
1 end, 2/52's worsted, white and brown twist = 1 end.
1 end, 2/52's worsted, drab = 1 end.
1 end, 2/52's worsted, white = 1 end.
7 ends, 2/52's worsted, drab = 7 ends.
1 end, 2/52's worsted, white
1 end, 2/52's worsted, drab
1 end, 2/52's worsted, white and brown twist
1 end, 2/52's worsted, drab } × 3 = 12 ends.
1 end, 2/52's worsted, white = 1 end.
1 end, 2/52's worsted, drab = 1 end.
1 end, 2/52's worsted, white and brown twist = 1 end.
4 ends, 2/52's worsted, drab = 4 ends.
1 end, 140/2's white Chappé silk = 1 end.
1 end, 2/64's worsted, green = 1 end.
1 end, 140/2's white Chappé silk = 1 end.
1 end, 2/64's worsted, red = 1 end.
1 end, 140/2's white Chappé silk = 1 end.
4 ends, 2/52's worsted, drab = 4 ends.
1 end, 2/52's worsted, white and brown twist
1 end, 2/52's worsted, drab
1 end, 2/52's worsted, white
1 end, 2/52's worsted, drab } × 3 = 12 ends.
1 end, 2/52's worsted, white and brown twist = 1 end.
1 end, 2/52's worsted, drab = 1 end.
1 end, 2/52's worsted, white = 1 end.
7 ends, 2/52's worsted, drab = 7 ends.
1 end, 2/52's worsted, white
1 end, 2/52's worsted, drab
1 end, 2/52's worsted, white and brown twist
1 end, 2/52's worsted, drab } × 3 = 12 ends.
1 end, 2/52's worsted, white. = 1 end.
1 end, 2/52's worsted, drab = 1 end.
1 end, 2/52's worsted, white and brown twist = 1 end.
4 ends, 2/52's worsted, drab = 4 ends.

Repeat of pattern: 96 ends.

Filling:—70 picks per inch, all plain drab, 2/52's worsted.

Finish:—Worsted finish, 56 inches wide.

Worsted Suiting (Check).

Complete Weave.
Repeat 6 × 6.

Warp:—4,615 ends, all 2/48's worsted, 12 harness straight draw.

Reed:—18 × 4 = 64 inches wide.

Dress:

1 end, black
2 ends, black and white twist } × 3 = 9 ends.
1 end, black = 1 end.
11 ends, black and white twist = 11 ends.
1 end, black = 1 end.
2 ends, black and white twist = 2 ends.
1 end, black = 1 end.
11 ends, black and white twist = 11 ends.

Repeat of pattern: 36 ends.

Filling:—78 picks per inch, all 2/48's worsted, coloring arranged thus:

11 picks black = 11 picks.
1 pick black and white twist = 1 pick.
2 picks black = 2 picks.
1 pick black and white twist = 1 pick.
11 picks black = 11 picks.
1 pick black and white twist } × 3 = 9 picks.
2 picks black
1 pick black and white twist = 1 pick.

Repeat of pattern: 36 picks.

Finish:—Worsted finish, 56 inches wide.

Worsted Melton Suiting (Stripe).

Complete Weave.
Repeat 4 × 4.

Warp:—3,712 ends, 16 harness straight draw.

Reed:—13 × 4 = 71 1/2 inches wide in loom.

Dress:—

1 end, 2/48's worsted, black
1 end, twist { 30's worsted, black / 2/50's cotton, white } × 7 = 14 ends.
1 end, 2/48's worsted, black = 1 end.
1 end, 2/56's worsted, black and yellow twist = 1 end.
1 end, 2/48's worsted, black
1 end, twist { 30's worsted, black / 2/50's cotton, white } × 7 = 14 ends.
1 end, 2/48's worsted, black = 1 end.
1 end, 2/56's worsted, blue = 1 end.

Repeat of pattern: 32 ends.

Filling:—60 picks per inch.

Finish:—Melton finish, scour well, full slightly, clip on shear, 56 inches wide.

Worsted Melton Suiting (Stripe).

Complete Weave.
Repeat 12 × 4.

Warp:—3,890 ends, 12 harness straight draw.

Reed:—14 × 4 = 69 1/2 inches width in loom.

Dress:—

2 ends, 2/64's worsted, white
2 ends, 2/96's worsted, white and 2/50's cotton, white twist } × 10 = 40 ends.
2 ends, 2/64's worsted, white = 2 ends.
2 ends, 2/80's cotton, white = 2 ends.

Repeat of pattern: 44 ends.

Filling:—68 picks per inch, all plain white 2/20's worsted.

Finish:—Fabric woven in white—piece dyed black. Melton finish, scour well, full slightly, clip on shear, 56 inches finished width.

Cheviot Suiting.

Complete Weave.
Repeat 16 × 4.

Warp:—2,840 ends.

Reed:—21 1/2 × 2 = 66 inches wide in loom.

Dress:—

3 ends, 2/26's black and red mix, cheviot worsted = 3 ends.
1 end, 2/52's black and blue drab worsted twist, twisted with single 26's black worsted = 1 end.
7 ends, 2/26's black and red mix, cheviot worsted = 7 ends.
1 end, single 26 black cheviot worsted, twisted with 2/60's white cotton = 1 end.
4 ends, 2/26's black and red mix, cheviot worsted = 4 ends.

Repeat of pattern: 16 ends.

Filling:—46 picks per inch, all plain 2/26's black cheviot worsted.

Finish:—Cheviot finish, 56 inches wide.

Woolen Melton Suiting (Stripe effect).

Complete Weave.
Repeat 4 × 4.

Warp:—2,488 ends, 8 harness straight draw.

Reed:—9 × 4 = 68 inches wide in loom.

Dress:—

3 ends, 2 ply 6½ run, drab and white twist.....
2 ends, 2 ply 6½ run, white twist.....
1 end, 2 ply 6½ run, drab and white twist.....
2 ends, 2 ply 6½ run, white twist..... } × 3 = 24 ends.
3 ends, 2 ply 6½ run, drab and white twist..... = 3 ends.
1 end, 30/2's white Chappé silk (use double ends).... = 1 end.
1 end, single 50's worsted green, twisted with 96/2's white silk (use double ends)..... = 1 end.
1 end, worsted drab, and 2 ply 6 1/2 run twist..... = 1 end.
2 ends, 30/2's white Chappé silk (use double ends)... = 2 ends.
3 ends, 2 ply 6½ run, drab and white twist..... = 3 ends.
2 ends, 2 ply 6½ run, white twist..... = 2 ends.
1 end, 2 ply 6½ run, drab and white twist..... = 1 end.
2 ends, 2 ply 6½ run, white twist..... = 2 ends.
1 end, 2/40's worsted, orange..... = 1 end.
2 ends, 2 ply 6½ run, drab and white twist..... = 2 ends.
2 ends, 2 ply 6½ run, white twist..... = 2 ends.
1 end, 2 ply 6½ run, drab and white twist..... = 1 end.
2 ends, 2 ply 6½ run, white twist..... = 2 ends.
1 end, 2/48's worsted, yellow drab..... = 1 end.
2 ends, 2 ply 6½ run, drab and white twist..... = 2 ends.
2 ends, 2 ply 6½ run, white twist..... = 2 ends.
1 end, 2 ply 6½ run, drab and white twist..... = 1 end.
2 ends, 2 ply 6½ run, white twist..... = 2 ends.
3 ends, 2 ply 6½ run, drab and white twist..... = 3 ends.
1 end, 30/2's white Chappé silk (use double ends.... = 1 end.
1 end, single 30's worsted green, twisted with 96/2's white Chappé silk (use double ends)..... = 1 end.
1 end, 2 ply 6½ run, drab and white twist..... = 1 end.
2 ends, 30/2's white Chappé silk (use double ends)... = 2 ends.

Repeat of pattern: 64 ends.

Filling:—50 picks per inch arranged thus:

53 picks, 4½ run woolen yarn yellow drab mix.
1 pick, 2/48's worsted, dark brown.
11 picks, 4½ run woolen yarn, yellow drab mix.
1 pick, 2/48's worsted, light brown.

96 picks per inch.

Finish:—Melton finish, scour well, full slightly and shear, 56 inches finished width.

REMARKS ON COLORED COTTON.

In spinning dyed cotton, the twist has an important bearing upon the tension of the rovings. Many carders crowd too large an amount of roving on a bobbin, and in doing this, a great tension is used upon the ends. This may act if there is much twist in the roving, but if not, notching of the roving is unavoidable, and slack twisted yarns are spun. Before a roving is run off it must be wound on, and here it is that trouble takes place in stretching. As little tension and twist as possible is necessary to overcome the evil—hard twist injures the drawing and spoils the rollers. It may be said that the rollers can be set farther apart to allow for this extra twist, but what about the value of the production? The cone belt will not help the tension of the several kinds of roving, but the difference may be corrected by wrapping the roving round the leg of the flyer.

Top rollers must, in this class of spinning, have an equal amount of weight; the saddle must be true, so as not to touch the side of the back rollers. If lapping takes place or sticking occurs on account of the dyestuff, instead of increasing the tension, use whitening. The rack gear and compound motion must be kept thoroughly clean and lubricated—this gives an easy drag. If very much of a hank change is requisite, distribute over all the machines and not all in one place. The fact is, strict attention is required, and the frames must be properly set for the quality of the cotton used, this being the most important point in successful spinning. The oiling or rollers and spindles regularly is another point that must be attended to, and on no consideration, fall into the error of having the drafts too long in the rollers, nor any draft between the back and middle rollers, except the bare amount necessary to keep the roving straight.

THE DIFFERENTIAL WINDING OF THE ROVING UPON THE BOBBIN IN SPINDLE AND FLYER MACHINES.

This procedure, as a rule, is not very clearly understood even by practical operatives. The object of the cone pulleys is to regulate the winding of rovings upon the bobbins; the delivery from the front roller is merely twisted sufficiently to allow winding or unwinding without stretching, so that great care is necessary to prevent any extra strain.

TO PREVENT IRREGULARITIES,

the winding must be done without the rove being stretched in any way; that means that no draft whatever is permissible between the bite of the front roller and the circumference of the bobbin, as if any number of inches of the material is delivered by a front roller per minute, this number must be wound upon the bobbin in the same space of time. The diameter of the bobbin increases at each traverse by about twice the diameter of a roving, therefore, the circular velocity of the

bobbin must be either increased or diminished on the completion of each traverse, the increase of speed taking place if the flyer leads and decreasing when the bobbin leads. The amount of speed either way depends upon the thickness of the hank roving, but variations in this respect are regulated by an equal change in the rack wheel, the cone pulleys giving the difference in speeds. The top or driving pulley is a hollow curve; the bottom one is convex or of a round surface. Its number of revolutions decreases in the same proportion as the distance the belt has moved through towards the opposite end of the pulley. Let us suppose these revolutions decrease by 5, when the belt has moved one inch along the pulley; then, if the belt should move 5 inches, we have $5 \times 5 = 25 =$ the number of decreased revolutions. The axes of the two pulleys must be parallel and the belt kept at a proper tension, otherwise the belt will naturally cling to a parallel line and grip more strongly the largest diameter with which it comes in contact. The strain of giving driving power between the two cones corresponds with a line drawn from the edge of the belt upon the largest diameter of the driving pulley or cone, to another line upon the opposite edge of the belt on the largest diameter of the driven cone. This is the test point to discover if all is right in the speeds and strain; at the same time it very plainly shows that the most severe strain is upon the edges of a belt. If a belt is seen to adjust itself to the surface of the cones, the entire width is used with satisfactory results.

THE DIFFERENTIAL MOTION.

The differential motion in its mechanical details, requires a close study of its operation to fully grasp its peculiarities. It may be said that, if a bobbin and a spindle revolved with the same speed, the roving would receive twist, but we are met with the fact that the twist would not be wound upon the bobbin; here then it becomes clear that if we can give the bobbin a greater speed than the spindle we overcome this obstacle by winding on the twist at a rate which shall be different between the spindle and bobbin speed; but should the bobbin continue to rotate at this one speed all would be useless, because the roving would be torn asunder in a coil or two. Hence the velocity of the bobbin must receive some diminution of its speed at the completion of every layer. In general the excess in number of revolutions which a bobbin makes over the spindle speed is inversely as the diameter of the bobbin; but it must be noted that the bobbin speed is uniform during its rising and falling motion on the spindle, and at once diminishes at the moment when a change takes place in this up and down movement, because the diameter of the bobbin is increased by each coil.

A FEW POINTS ON WOOL AND WORSTED MANUFACTURING.

Worsted yarn consists of fibres reduced to a parallel condition by combing, drawing, etc., and as all short fibres are removed by the process of combing, those remaining are nearly of one length. These two points form the chief difference between worsted and woolen yarn as in the latter the fibres lie in every direction, so that in cloth made from the former yarn defects are much more easily detected, even when the woven goods are finished in the same way, but the method adopted in finishing worsteds serves to bring out faults clearly, as these fabrics as a rule are shorn bare in order to present a clear and distinct face, so that faults are readily discovered. Woolen goods are gigged or napped, and generally a good part of the nap remains on the fabric after finishing, a feature which often hides deficiencies.

Many defects are caused by faulty mixing of several kinds of wool having different characteristics, which defects are more easily discovered in the piece than in the yarn. Besides creating trouble in the weaving they cause great annoyance in the dye houses, because some kinds of wool have a greater capacity to absorb dyestuffs than others, and, therefore, when different kinds are mixed together it is impossible to produce a dyed fabric free from blotches, gray spots, stripes, etc. To prevent these, wool with similar characteristics only must be mixed, especially if intended for piece dyed goods. The quality and condition of the yarn also requires attention. The man-

ufacture of worsteds being much more complicated than that of woolens it is absolutely necessary that all the machines required in the mill operate in a perfect manner in order to obtain satisfactory results. Many of the defects noticed in piece dyed goods can be directly traced to an imperfect working of the wool during the processes of carding and combing. If these processes are not carried out with the greatest care, the single fibres are not laid parallel but cross here and there, and a defective lustre in the fabric will be the result.

Inequalities in the yarn are also the cause of many imperfections, and although some of them may be corrected by the burler, others will remain in the piece and every endeavor made to remove or hide them will simply make them more pronounced. Another defect and one which originates from the same cause, consists in a somewhat different appearance of the pattern in different places,—where the yarn is thicker it will be more pronounced, while it almost disappears where the yarn is thin. The use of single instead of double and three ply yarn, for the purpose of producing cheaper goods will increase the number of defects greatly. The former being softer than the latter, as well as more fibrous, they do not produce so fine a piece of goods. This is easily shown by manufacturing two pieces of goods of the same weave and of the same wool, but one of single and the other of double yarn. The former will not only be much inferior in appearance to the latter, but it will also have a harsher feel and will not be as strong. It is sometimes said that single yarn used as filling imparts a softer feel to the cloth than double and twist yarn, but what is gained in this respect is counterbalanced by the loss of quality, uniformity, and appearance. Much objectionable yarn is also manufactured in the endeavor to spin a fine number from inferior wool, but the result is a yarn full of thin and thick places, not sufficiently elastic, which will break readily and is apt to tear easily. In order to reduce to a minimum the danger from defects of this kind in filling yarn, two or more shuttles should be used in weaving, and great attention should be given to the carding, combing, drawing and spinning of the wool.

Many defects in worked cloth are caused by its faulty construction. Before the manufacturer decides in what style he wishes to have the warp woven, the weight of the goods as well as the character of the weave must be considered. The weight of the piece is regulated by the texture of the fabric and counts of the yarn used, while its appearance depends upon the pattern employed. Thick yarn and open interlacings must be used for heavier goods. The warp drawn in too closely is a defect frequently met with, and when in turn the filling is introduced with difficulty, the cloth receives a disagreeable feel. Should there be difficulties in producing a sufficient weight, the manufacturer can resort to one of two methods; either take heavier counts of yarn and set the warp more open in reed, or use a weave with larger floats and the same number of yarn, but set more closely in the reed. If the piece is to be gigged, the warp must be reeded more open than for the ordinary style of finish, as fabrics of this kind will always increase proportionally in weight during fulling.

Again the weave itself is often a defective one, especially in worsted goods, where frequently softness of feel, suppleness and durability in weaving must, in many instances, be sacrificed to a pleasing appearance and novelty of design. No weave is better than the ordinary style of twill, but the changes in fashion do not permit its continual use, and the manufacturer often meets many difficulties in his endeavors to cater to the constant demand for novelties. Hard and narrow styles of weaves are frequently introduced to obtain peculiar effects, these weaves being occasionally combined with coarse and open styles, and then trouble results in the weaving, washing, and finishing. Two or three beams are often required in weaving, and if these have not been perfectly adjusted, imperfect goods, varying in appearance, are the result. The peculiarities of worsted facilitate to a high degree the production of novel effects, but unequal conditions should not be combined in the same fabric, unless they have been modified so much that the combinations

can easily be woven together, will shrink in equal proportions, and offer a fairly equal face for the finishing operations. Many defects occur in these goods either in the weaving or in the preceding processes. The warp must be beamed uniformly so that the threads lie parallel with one another, as if the tension of the threads upon the beam differs, it must show this defect in the piece, and cause stripes and uneven places.

The formation of a good, open shed is also of the greatest importance. Although the width of the shed changes with the size of the shuttle, it should be more open for close than for loose weaves; again the shuttle should leave the box at the right time, or its operation is impeded. The let-off and take-up motions of the loom must work well together, the bobbins be equally spooled, and the thread delivery from the shuttle regulated so that only the exact quantity of the filling required by the width of the fabric is unrolled. It is well to use two or more shuttles because the filling near the end will always unroll more quickly from the bobbin than at the beginning and, for this reason, one shuttle may be refilled while the other is still moderately full. Thus it will not happen that the filling will draw off from one bobbin either full or empty.

TURNS OF TWIST PER INCH IN COTTON YARN.

To put a certain amount of twist in a thread, a greater percentage for twist variation is required in ring than in mule spinning. Mule yarn with 22 twists per inch is, as a rule, stronger, smoother, more even and elastic than the same counts of yarns ring spun, with 26 twists per inch. Ordinary mule spun yarn has a multiplier or constant factor, 3.25 for filling, 3.75 for warp; the ring spun filling, 3.8, and warp from 4.7 to 4.9. But the ring frame production is greater per spindle and the cost per pound is less, a feature which shows the reason why ring spinning for certain counts is preferred to mule spinning, although the mule gives considerably less variation, a feature, however, which, with some filling yarns, cannot be discovered.

If a very soft twisted, elastic thread is required for special cloth textures, the mule spindles are set at a bevel, which allows the threads to slip off the spindle points without any resistance, or with as little as possible. In order to effect this ease in slipping off, the velocity surface of the mule carriage is less to correspond with the surface speed of the front rollers during the stretch, and to keep the contraction of the twist to take up a given amount of delivery of the front rollers, with a proper tension on the yarn, and the carriage draft is equal, or, perhaps, rather less than the surface speed of the front roller. In spinning without a carriage draft, the spindle will put in the required twist per inch that the length of stretch and revolutions of spindle stretch figure allow, but it must be noticed that a full cop puts in more twist than a small cop, only partly full. The reason for this being that, on a full cop, the spindle has a shorter and firmer grip on the yarn, preventing the thread from slipping off the point to the same extent, when the cop is small and the distance greater from the nose of the cop to the spindle point, but this small amount of variation will, to a certain extent, depend on even rovings, or whether they are single or double.

As an example: 36's filling, 2 inches carriage draft, total stretch 62 inches; rim pulley revolutions per stretch 88; rim diameter 19 inches, centre pulley diameter on cylinder shaft 10 inches, cylinder diameter 6 inches, spindle wharve diameter .75 inch.

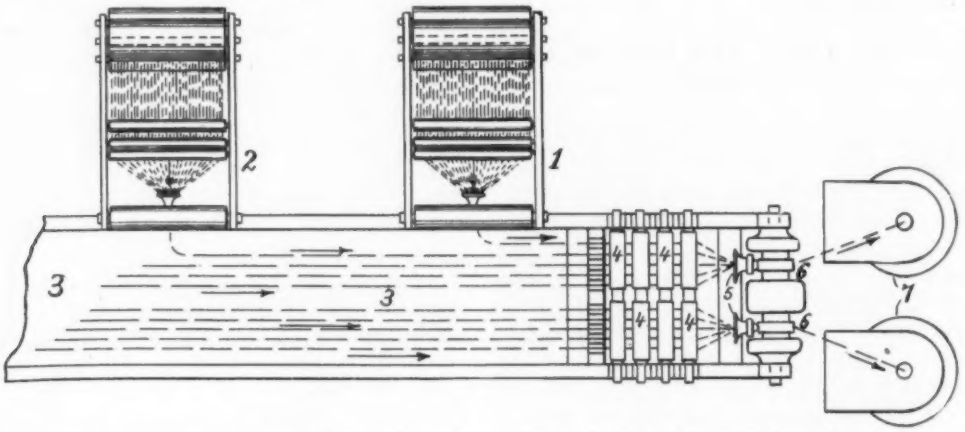
Then $88 \times 19 \times 6 \div 75 \times 10 =$ revolutions of spindles per stretch $\div 62$ inches $=$ 21.56 turns per inch of twist, without any allowance for band slipping, etc., but allowing a due percentage, the number would be 19.84 turns, the roving used for this calculation being single average 4.3 hank. In very fine spinning both warp and filling yarns require a good amount of carriage-draft or drag and less bevel, to keep out snarls.

The traveler, in ring spinning, revolves in a contrary direction to the mule spindle—the latter directly puts in the twist. The traveler is driven at a certain speed by the yarn, when the bobbin is empty, then at a greater and more variable speed as the diameter of the bobbin increases, and this causes the great difference in the twists of the two classes of yarn, ring and mule.

AN ENGLISH IMPROVEMENT FOR THE DRAWING MOTION OF COTTON COMBING MACHINES.

This improvement consists in dividing the delivery of the series of "comber-heads" (from 6 to 10 heads being used) into two sections. The drawing rollers at the delivery end of the combing machine are correspondingly made in two sections, one-half of the delivery of slivers (say 3, 4 or 5 as the case may be) passing through each section of said drawing rollers, in turn passing through a separate trumpet and calendering or delivery rollers into a separate can. This arrangement, as will be readily understood, permits an increased "output" as compared when using single series drawing and calendering rollers in connection with one trumpet between them and delivering in turn in one can. The whole gist of the improvement really consists in providing double the number of drawing motions to a given number of comber heads delivering to it, for which reason the speed of the combing machines can be considerably increased and the draft diminished, resulting in a greater production of work done without deteriorating the quality of the product.

For a better understanding of the procedure the accompanying illustration is given, being a plan of sufficient of a cotton combing machine to show in what relation to the carding-rolls the drawing rolls are placed.



A cotton combing machine usually consists of a series of from six to ten "heads" 1, 2, arranged along the side of a polished iron plate 3, along which the slivers proceed in parallel lines in the direction of the arrows, toward the drawing rollers, 4, at the delivery end of the combing machines. These drawing rollers, 4, are made into two sections and 3, 4 or 5 ends or slivers (as the case may be) passed through each section of the drawing rollers, in turn through a separate trumpet 5, and then through the calendering or delivery rollers 6, into a separate can 7.

THE ANALYSIS OF A SAMPLE.

If properly carried out, this is of the greatest importance to any textile student, hence a few remarks on this subject will be of interest to our readers. The work requires two very important accompaniments, viz: good eyesight and an inexhaustible amount of patience, two features without which it will be useless to expect any degree of success.

The principal objects to be arrived at in the analysis are:

First, The material used.

Second. The counts of the yarn, accompanied with the amount of twist.

Third, The fineness of the fabric, i. e., quality of stock used in the construction of the fabric.

Fourth, Number of threads per inch in warp and filling, i. e., its texture.

Fifth, The weave, and

Sixth, The color arrangement, or the pattern, if such is used in the construction of the fabric.

IN UNION FABRICS,

or cloth composed of wool, cotton and silk, a good lens is necessary by means of which the different fibres can be readily ascertained. If not possessing a good microscope, cotton and wool fibres can be distinguished from each other by simply burning the ravelings of the sample and the peculiar smell of the animal fibres will readily be noticed. Cotton fibres flash and burn rapidly, although this test cannot always be depended upon with reference to cotton on account of the dyestuffs used. In order to detect cotton or other vegetable fibre in wool or silk fabrics, boil the sample to be tested in a solution of caustic soda or potash, when the wool or silk fibre (animal fibre) will readily dissolve producing a soapy liquid. Cotton (or other vegetable fibre) contained in the sample will remain undisturbed, even if boiled in weak caustic alkali for several hours, provided care is taken to keep the sample under the surface of the solution during the operation, as if exposed to air the cotton fibre would become rotten, especially when the exposed portions at the same time would be brought under the influence of steam. Any cotton fibre remaining from the testing, if colored, may be bleached in chlorine water and afterwards dissolved with cupro-ammonia.

To detect silk from wool or cotton, it may be mentioned that the best solvent for silk is an alkaline solution of copper and glycerine made up as follows: Dissolve 16 grams copper sulphate in 140-160 c. c. distilled water, and add 8-10 grams pure glycerine (Sp. Gr. 1.24); a solution of caustic soda has to be dropped gradually into the mixture till the precipitate at first formed just re-dissolves; excess of NaOH must be avoided. This solution does not dissolve either wool or the vegetable fibres and thus serves as a distinguishing test.

PREPARING THE SAMPLE FOR THE PICKING OUT.

This is the time where the patience of the student comes in, as otherwise, with hard samples, he will not succeed. Certainly the procedure will be much more easy for him if he has a thorough understanding of the theory of constructing the various weaves, both for single and double cloth. Picking out the weave means to the designer that he is to solve from a given sample the manner in which both systems of threads (warp and filling) composing the fabric interlace with each other. An experienced designer will in a great many cases ascertain the weave necessary for producing the given sample by a mere glance at it, while in fabrics where fine yarns and high textures—silk or cotton—are used, the microscope (pick glass) will greatly assist him in designating the weave without much picking out. But as such skill can only be reached after years of practice and experience, the novice, young designer, or student, would do well to follow carefully the description of the processes thus given.

Always endeavor to get the samples for picking out sufficiently large, containing at least two, three or more repeats of the weave warp and filling, in excess of the amount of cloth necessary for liberating the threads in each system so as to get the proper starting point for commencing the procedure of picking out. If a sample is submitted for analysis which does not contain a complete repeat of the weave, dissect the amount on hand and complete the weave by theory afterward. If a fabric is very much fulled or felted, its face must be shaved carefully. Singeing the fibres may be adopted, but this is rather risky and if done must be done carefully.

Next, one or more threads are taken each way in the sample and carefully examined in order to ascertain which is the warp and which is the filling.

When dealing with a sample having a selvage, the latter will readily distinguish warp from filling as the selvage threads always run in the direction of the warp.

If the threads in one system are twisted harder than those in the other, as a rule, the harder twisted threads belong to the warp.

With reference to face finished fabrics like cassimeres, kerseys, broadcloth, etc., the direction of the nap on the face of the fabric indicates which way the warp runs in the cloth.

Another way to distinguish warp from filling as used in a sample is the counts of yarn found, as in most cases the warp is of a finer count than the filling.

When finding cotton yarn used in one system of the threads and wool in the other (union fabrics), the cotton yarn, as a rule, is used for the warp.

In cotton fabrics when one system of threads is sized or starched and the other not, the starched threads belong to the warp system.

Another guide for distinguishing warp from filling is the style of the fabric under consideration (fancy fabrics) as pure stripe effects readily distinguish warp from filling, the stripe effect always being produced by the former system. In checks, a more pronounced effect is mostly produced by the warp and the check itself is more elongated warp ways in order to prevent as much as possible "run-around" imperfections in the cloth.

When dealing with fabrics composed of one system warp, two systems filling, especially when using a backing (short low staple), the filling system is readily distinguished.

Having thus ascertained which is warp and which is filling, as well as taken out sufficient ends of every system to get a proper start, we may proceed with the actual picking out of the weave from the sample, commencing to take out with a strong needle the first thread across the cloth, beginning at the left and noting down on the point paper how the thread intersects. The thread is then taken out and placed carefully to one side, the color, count, and fibre being noticed and marked. Every successive thread in the sample is treated in the same manner until the "repeat" of the weave is obtained. By repeat of weave we mean until we arrive at threads which, with reference to their interlacings, are an exact duplicate and in the same rotation, as former threads.

With some fabrics it will be advisable to pick out the filling from the warp. This refers to twills, granites, etc., where the stronger warp yarn used will better stand the handling necessary during the process of picking out. However, there are systems of weaves like corkscrews, diagonals, etc., where it will be much easier to pick out the warp from the filling as, with such weaves, a few warp threads picked out will at once designate the proper weave; not only will they come out easier, but at the same time the warp threads will interlace with the filling more in bunches; by that we mean that 4 up 3 down, 2 up 2 down, etc., will be easier for picking out than those of 1 up 1 down, 2 up 1 down, etc., interlacings that occur in weaves mentioned when picking filling from warp.

After liberating the entire number of warp threads and picks that form one complete repeat of the weave, the various threads are thoroughly examined so that we may know whether they are cotton, silk or wool, coarse or fine, single or twisted, mixtures or solid dyed colors.

It is a good plan to pick out two repeats of the weave in order to avoid any possible mistake.

In connection with large complex designs or cloth analyses, they may require reducing to the least possible number of harnesses in order to be able to reproduce the sample in the harness loom. For this purpose follow the following

Rule:—Ascertain repeat of the weave in the direction of both systems of threads, and examine each warp thread separately on the design as to its rotation of interlacing in the filling. If each warp thread shows different places (different picks) for interlacing with the filling, each thread requires a different harness. Again if there are warp threads in the repeat of the weave which have throughout the entire number of picks the same places of intersecting, such threads can be drawn on one harness; this procedure being in turn the cause of being able to reduce our weaves to a comparatively small number of harnesses. After having ascertained the respective fancy drawing-in draft for such a weave, the harness chain is prepared by reproducing each warp thread only the first time called for by its drawing-in draft on a different harness.

The number of warp threads and picks per inch in the sample are ascertained most conveniently by means of the "pick glass" or a magnifying glass of medium power, having for its base a cut-out plate either exactly one-half or one inch square.

CORRESPONDENCE AND NOTES

Upon Textile Topics at Home and Abroad.

BURNING SOFT COAL SMOKE.

[The article by Eben Gould in the April issue describing a boiler setting for burning the smoke from soft coal has attracted much attention and brought out many expressions of opinion. Following are two letters, one favoring, and the other opposed to the Gould idea. The boilers were set by Mr. Gould with this arrangement about forty years ago, and the recent publication of his description comes at a time when one inventor, having developed the idea without any knowledge of the Gould experiments, is about ready to offer it as a commercial proposition. Ed.]

Nashville, Tenn., June 20, 1903.

Editor Textile World Record:

Mr. Leonard Parks, President of The Nashville Woolen Mills, who is my next door neighbor, came to my house this evening, and while we were having a smoke on the porch, the conversation naturally drifting from one subject to another, he finally arose and remarked:

"I have a magazine over at my house containing an article I want you to see." He went home, returned in a few moments with a copy of The Textile World Record, for April, 1903, turned to page 112 and called my attention to an article by Eben Gould, on "Burning Soft Coal without Smoke." I read the article and reread it, and I was so struck with our ideas running together, that I said to Mr. Parks:

"Do you suppose they would allow me to contribute an article with illustrations to show another device on the same lines?" He replied that in his opinion not only would it be accepted, but gladly, as it was interesting mill men all over the country. Mr. Parks knew that I had for some years given a great deal of attention to this subject, both with a view of suppressing smoke as a nuisance, and of converting the smoke and gases into kinetic energy and thus saving fuel.

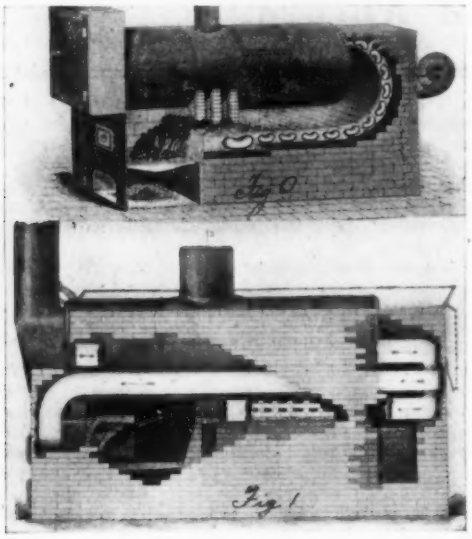
In my younger days I was a mechanical engineer, and later a physician, and of course incidental to this latter calling a chemist. From the first when I began like Mr. Eben Gould to experiment I thought I understood what was necessary and the conditions which must prevail to burn smoke from soft coal, but alas like all our theories, theory is one thing and practical success another, but I began my experiments. I knew that carbon was quadrivalent, and that oxygen was only bivalent, and I knew that carbon dioxide was the result of the union of these elements under heat, or in other words, was the result of absolute combustion, carbon being a four-timer in value or, in making change, being a four-dollar bill, while oxygen was only a two-dollar bill, it would take two two-dollar bills or two oxygens to equal one four-dollar bill or carbon.

I tried this combination in a furnace, carefully regulating my elements, but I found my theories would not work worth a cent. I then found an old iron cylindrical tank six feet in diameter by sixteen feet long, and placed in it a worm still coiled pipe 300 feet long. I filled this tank with burning gas so as to heat the coil pipe to 600 degrees, and then I connected this coil pipe at lower end with a smoke pipe, taking the smoke direct from burning soft coal; I set up an oxygen generator and had an auxiliary pipe to lead the pure oxygen into this red hot iron smoke pipe, and said to myself, "Now if this doesn't work, there is nothing in chemistry certain." Well I fired it off, and, would you believe me? the upper end of my pipe which I expected would discharge a slight opalescent vapor of carbon dioxide, did actually discharge what looked for the world like the tailings from a clover huller in a field when running on very dry clover cuttings—a dirty yellow thick smoke, and no combustion had taken place at all.

I quit in disgust, but could never rid my mind of the phenomenon, and determined if possible to find out why combustion would not take place where the conditions were such that it appeared absolute combustion should take place. After recovering from my disgust and disappointment, I bought a return fine tubular boiler 60 inches by 18 feet, and built it to a furnace of my own notion, putting, as Mr. Eben Gould did, a six-inch pipe in the side walls as shown in enclosed cut marked figure O. This pipe in the side walls delivered the air from a blower into tiles laid crosswise in the floor of the combustion chamber side by side, extending from rear to front of bridge and connected by knuckle joints or turns of the same tiling. This contained a six-inch hollow, and at the bridge I had the last three sections of this tile which formed the bridge made larger, and with a hollow of 10 inches, and in the last three larger tiles I cut mortises down from upper surface into the hollow below. These mortises were, from centre to centre, six inches, and were cut at right angles to the length of the large tile in which they were set. In these mortises I set up perforated standards or bents made of the best fire clay, and had them perforated on their latter sides so as to let the smoke and gases from the grate fire pass between them. (I have omitted to say that on my first trial these upright bents were not set at bridge,

but about the middle of the length of boiler, and about six feet from the bridge.)

I fired it up and to my astonishment again it would not burn a particle of the smoke. Again filled with disgust I left all scientific thought alone, and simply went to tinkering or monkeying with



it, as we would say, and happened to take it into my head, for no scientific reason, to move the large tiles and make the bridge proper of them, and let them be right up against or at rear of the fire.

This was fired up, and to my delight and astonishment, the whole interior of the furnace presented the appearance of a Welshbach gas burner, and all the smoke and gases were completely burned. For the life of me I could not understand why this was so when I had exhausted, as I thought, every scientific principle to make the same thing take place before. Continued experiments, however, at last revealed to me why, and right then I solved some things touched upon by Mr. Gould, which perhaps to him remain dark, and hence my desire to give the benefits of my investigations to him and others who may be interested.

Now let us take any ordinary furnace for generation of steam. The coal is placed upon the grate bars, and pitched pell-mell in with a shovel, covers the grate bars and is fired; the draft coming in under bars in ashpit must come up through this coal. As there is an excess at all times of the coal, or four dollar bills, over the oxygen, or two dollar bills, that must unite with the four dollar bills to make complete combustion, the result is that all the two-dollar bills are exhausted right at first by coming in contact with the coal. As the air relatively contains 79 per cent. of nitrogen and only 21 per cent. of oxygen, and the oxygen fails to supply enough partners, or two-dollar bills to the coal or four-dollar bills, the unsupplied four-dollar bills must arise in the form of smoke or rather gas, and floating carbon. At that moment these gases are in what we call in chemistry the nascent state. Nature abhors free atoms as much as she does a vacuum; these gases in the nascent state being excited to their highest affinities and very much desiring a partner with which to unite, and the whole interior of the furnace above the coal at that moment containing 79 per cent. in volume of nitrogen, these gases and the nitrogen form a chemical compound which I call "nitro-carbide," but which is known as "smoke." After it has been formed it is absolutely incombustible, as proven by my experiments with the gas tank containing the worm.

Now by having the upright air tubes right at the bridge, the gases and floating carbon received red hot air before this chemical combination of the nitrogen and gases could take place, and as oxygen is the element with which the gases have the strongest affinity, if oxygen be present in proportion of two parts oxygen to one of carbon, then we have complete combustion.

Now I thought I had made and perfected a great invention, and saw in prospect millions of dollars and the thanks of the world, but after burning this furnace for a week or so, and shutting it down, I found that my upright bents were cracked all to pieces as a result of opening the fire doors and letting the cold air rush against them while they were white hot. Then, too, I found that this construction was impractical from its cost. Then I turned my attention, as I now had the principle, to making a furnace that would be low in first cost, and that would stand hard use. Fig. 1 shows the construction for a return flue tubular boiler.

I first built a double arch over the fire box. This double arch is spaced between four to six inches for air, and the upper arch extends to cover half the length of grate bars say 28 inches and the under arch stops short of the upper one by 6 inches. Next comes a sheet metal flue made rectangular in shape, say 6 by 12 to 14 inches (for different size boilers) and of 3/16 metal; this begins by being encased in the side wall just above floor of combustion chamber, opens at rear end of boiler side wall, runs in brickwork along just the thickness of one brick on the flat from fire, comes to front and delivers air into the double arch. The same arrangement is made on the other side.

Then there is another sheet flue built above this, with its opening beginning to take air from the front end; it passes from the front in the side wall until it reaches the centre of the rear cross wall where it bows in the back wall to get around the former flue. Then it emerges from the brick wall just in the angle made by floor of combustion chamber and side walls and runs along in this corner or angle until it reaches the bridge, which is built with a hollow. This bridge is in the form of an arc of a circle; the air flue as observed butts right into the rising ends of the bridge and delivers hot air into it. The hollow which extends from side wall to side wall is spanned fore and aft with fire brick, leaving air ports between them; a continuous checker-work of fire brick is built up on this bridge and floor of combustion chamber back for six to seven feet. The flues all have doors and are worked by rods and chains from the front in handy reach of the firemen.

Now comes in another of Mr. Eben Gould's points. This furnace doesn't need the ashpit doors set wide open, and if it is done it will not give satisfaction. Cut off just 50 per cent. of the

in-take under the ashpit, set the doors to air flues open, and as soon as the furnace begins to heat up, the gases and smoke will be as completely burned as the best coal oil lamp burns the smoke and gases. The hot air from the double arch completely surrounds the rising gas and smoke from upper side; the air from the bridge completely surrounds them on under side, and the whole volume dashing into the checkerwork of fire bricks, which are at all times white hot, is there thoroughly mixed and rebounds back over the double arch and swirls round and round. The fact of the arch acting to shut off the heating surface above it, as it would seem in practice to do, does not reduce the boiler heating surface at all.

No smoke or gases are left to reach the beginning of the flues at rear end, for they are all completely burned up *under* the boiler and the result is that all the energy contained in the coal is liberated while *under* the boiler. This being so, here is something as a result of the work of this furnace, that, aside from suppressing the smoke, should cause manufacturers to stop and think.

Every man who has ever analyzed our soft coals knows that they will on an average contain more than 30 per cent. of olefiant gases and that there is anywhere from 10 to 18 per cent. of the carbon that is not fixed carbon proper, but is what we would call volatile. In burning coal in closed furnaces this much of it will rise as soot and float off in the gases.

It is a dead certainty that gas cannot be ignited even, without hot air being first mingled with it, and from this, doesn't every man know that this 30 to 38 per cent. of gas which the soft coals of this country contains, are not burned, but go right out of the stack and not only are lost, but bedaub and besmirch our buildings, our clothing, our bodies and the face of nature with filth?

Any mill man who would let a hole remain in his pocket through which 35 per cent. of every dollar he put into it would run out and be lost, would be considered non compos mentis, but he will buy coal and pay cash for it, and let 35 per cent. of it soar off in the clouds and settle on his beautiful home and loved ones, and feel that if his dividends are not large enough the only way to remedy it is to reduce expenses by a reduction in wages, with the resulting strike, or a shut down. The first cost of the furnace I have described, applied to the largest boilers in use in any mill in this country, will not be more than $500; for any boiler under 100 H. P. it can be installed for $300 and leave a good profit to the man doing it. If, when it is installed, a careful record of the coal used in it is kept, and the results compared with the coal used under same boilers prior to installing the furnace, it will be found that this furnace will pay for itself in from two to three months, to say nothing of the better conditions existing around the mill from a clear atmosphere.

I have written this article because I know there are many who will be glad to see it, and not because I have anything to sell. If I have helped my countrymen and brightened their hopes by letting them know that there is something coming which will make a ton of soft coal for steam purposes worth as much as a ton of anthracite and clean up the atmosphere around manufacturing centres, I am for the present well paid.

JOHN BROWN HARRIS, M. D.

West Point, Ga., June, 1903.

Editor Textile World Record:

On page 112 of your April issue you publish an article by Eben Gould on "Burning Soft Coal without Smoke" that is misleading in its premises. He tells us about his boiler, four feet in diameter with eighteen feet tubes, that by using air heated to 300 degrees, 72 inches was enough (draft opening) for a 4-ft. boiler. If Mr. Gould had given us his grate areas we would have had something tangible to work from, but as he failed to do this and also failed to tell us how many tubes he had to the boiler, or how large they were, we have very little knowledge of the actual conditions surrounding his "experiment". Personally, I should like to see the results of some tests run in his plant, giving all the details, as they might prove an interesting study, in point of economy, not only to us, but to Mr. Gould himself. I would like to ask Mr. Gould, if he was never troubled with air leakage from his brick air ducts into the combustion chamber of his boiler. I never yet saw a boiler setting that did not crack more or less, and I should think in his case a very few cracks would materially reduce his draft pressure and spoil his combustion.

Another prominent feature of Mr. Gould's plan, is his inability to vary the amount of the air supply. Does he use the same amount of air, when burning ten pounds of coal per square foot of grate per hour, that he would use when burning twenty-eight pounds? Does he advocate the use of 72 inches of draft opening per 50 commercial horse power of boiler, regardless of the ratio of grate area to heating surface?

Does he think that hole in his bridge wall a source of economy?

Bourne, in his large work, "Steam, Air and Gas Engines," states:

"A moderately thick and hot fire with rapid draft, uniformly gave the best results." "Combustion of black smoke by addition of air was a loss." "In all experiments the highest result was always obtained when all the air was introduced through the fire bars."

Mr. Gould says, "the chamber back of the bridge wall was full of a continuous white heat which was not the case when the ashpit doors were open and cold air used for draft." If, in reducing the draft area, he cut the air supply down to the theoretical limit then his temperature of combustion must have been in the neighborhood of 5,000 degrees, F., and remember, it was into this mixture of gases, approximating 5,000 degrees, that he forced his "hot air" at 300 degrees, "and in that way burned what smoke there was." That extra 240 degrees certainly worked wonders. I wonder how big that hole in his bridge wall was, anyway!

Now in regard to reducing draft areas in well designed boilers under chimney draft, the experiments of the United States Navy show that ordinary furnaces require about twice the theoretical amount of air to secure perfect combustion. Prof. Schwackhoffer, of Vienna, found in the boilers used in Europe, an average excess of 70 per cent. of the total amount passing through the fire, or that over three times the theoretical amount was used. A series of analyses by Dr. Behr, of the escaping gases from a Babcock & Wilcox boiler, with chimney draft, showed an average excess of air equal to 48

per cent. of the whole quantity. Babcock & Wilcox, in their book, "Steam", page 42, say:

"Even when smoke is not visible, a large percentage of the combustible gases may be escaping into the chimney, in the form of carbonic oxide, or half burned carbon." "Numerous attempts have been made to cure this evil, by admitting air to the furnace, or flues, 'to burn the smoke'; but though this may allow so much air to mingle with the smoke as to render it invisible, and at the same time ignite some of the lighter gases, it in reality does little to promote combustion, and the cooling effect of the air more than over-balances all the advantages resulting from the burning gas."

Mr. J. W. Shepherd, in his paper before the Western Railway Club, says:

"Black smoke is unburned carbon from the hydro-carbons. It is unburned usually because of the lack of sufficient oxygen. * * * The steam generated from a quantity of water occupies about 1,800 times the volume of the water at atmospheric pressure. At a reduced pressure and high temperature, such conditions as one would find in a fire-box, the volume would be correspondingly larger. Therefore water introduced into a fire-box through any medium, upon becoming steam (and if not dissociated) occupies space that would otherwise be filled with other gaseous products. That is, the efficiency of the draft is impaired. This same effect manifests itself in firing on damp or rainy days."

Mr. J. C. Hoardley, in his warm-blast steam-boiler furnace, New York, 1886, made clear the inefficiency and the inadequacy of passages in brick settings as a means of heating the air prior to its admission above the fire. Sliding dampers were provided to regulate the admission of air from the passages in the settings and the openings in the bridge wall but,

"Careful and repeated experiments and observations proved that these dampers could never be opened without checking the draft through the fuel and lowering the temperature of the fire; and it is not impossible that a very slight leakage through the closed dampers may have lowered the efficiency of the boilers. No good was ever found to result from this system of flues."

Doubtless the most complete test of this character was conducted by Mr. Hoardley at the Pacific Mills, Lawrence, Mass., and in this case the result was more favorable, but the air was forced to the fire by a blower, and all the air was introduced below the fire bars.

"To return to the water in the ashpit; it is thought advantageous by some, in slowly burning furnaces having long flues, that the fuel should be slightly moist, and that ashpits should be supplied with water, from which steam may be generated by the heat radiated downwards from the fire, and passing through the fire grate. The access of water to the fuel lessens the glow fire or flameless incandescence of the fixed carbon on the grate, and increases the quantity of flame by forming carbonic oxide and hydrogen gases in its decomposition into its elements, oxygen and hydrogen, and the reduction, by the oxygen, of the carbonic acid already formed in the furnace. The newly made gases are afterwards burned in the flues. The presence of moisture, even in coke, gives rise to flame in the flues, and reduces the intensity of heat in the glow fire. The combustion, in fact, is deferred, or distributed, and it is on this principle that moist bituminous coals are most effective in furnaces having long flues, as in Cornish boilers."

I find the above statement in "Helios", page 25, but can find no confirmation of it in any standard authority at this writing, but give it as a possible explanation of that bright appearance described by Mr. Gould, as appearing on the top of his fire when using water in the ashpits. L. L. A.

THE NUMBERING OF CARD CLOTHING.

BY J. T. B.

The above subject is selected, owing to the fact that many connected with the mill, as well as textile students, often ask: "What is meant by the English counts" or "numbers" as applied to card clothing; and, how does the English system compare with the American method of using the number of wire? Before answering directly the above question, or entering upon any discussion pertaining to it, we may profitably include a few preliminary remarks for the benefit of our readers who are not acquainted with the general make up of a piece of card clothing.

Fig. 1 is a view of the surface of a piece of clothing, which seems to be covered with a number of individual wire teeth, as shown at A: these are further illustrated by a section of the clothing shown in Fig. 2. If, however, a view of the back of the clothing is obtained, we find, that what appear on the surface to be separate teeth, are connected at the back in pairs; and when extracted they are shaped as shown in Fig. 3, the whole, practically, representing a small wire staple, which, when placed in the foundation, presents two points on the surface, and the connecting bar remains on the back of the clothing.

These bars are known as the "crowns" and are represented by the lines in Figs. 4, 5, and 6. The position of the bars represent three different methods of setting them in the foundation. In Fig. 4 what is known as "rib set" is shown; in this style the teeth are set in groups of three, each group being known as a "nogg."

In Fig. 5 is shown the "twill setting," and although the teeth are in a continuous line, instead of in groups, it is customary to desig-

nate a "nogg," as equal to the distance from the edge of one "crown," to the edge of the next "crown," having its corresponding edge just touching a line drawn perpendicular to the edge of the crown first selected. For example, we find that the right hand edge of the crown A, is directly over the right hand edge of the crown B; while the teeth from A to B equals 6, therefore there are 6 teeth per nogg.

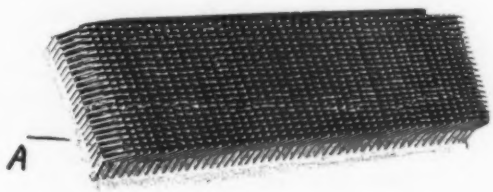


Fig. 1.

Fig. 3.

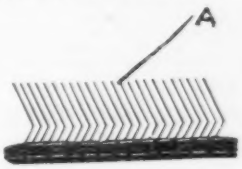


Fig. 2.

In Fig. 6 what is known as the "open" or "plain set" is shown, and in this style it will be observed, that it requires only two teeth to form a "nogg;" following the same procedure as with the previous styles. In all the above the distance from the end of one tooth, to the corresponding end of the next tooth on the same row, is known as a "crown."

Card clothing is made in "fillet" or "sheets;" the former being long, narrow strips, from one inch to 3 inches wide, and several hundred yards in length, and may contain either the "rib" or "twill" arrangement of the teeth; the latter, as its name implies, is made in sheets, the width varying to suit different circumstances, and the length usually being equal to the width of the surface for which it is intended; this may contain either the "twill" or "plain" set teeth.

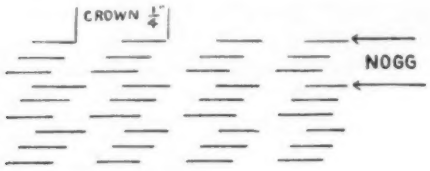
After the foregoing particulars, we are now in a position to return to the main question. Before the clothing was made in "fillet" form, the "sheets" were 4 inches wide, and contained the "plain" arrangement of the teeth. The "crowns," i. e., the teeth running the length of the sheet, were always the same number to the inch; but the "noggs," or the teeth in the width of the sheet, varied according to the number of teeth required per sq. foot; it was upon the number of teeth in the width of the sheet, viz., 4 inches, that English counts were based; for example, if 60 noggs were contained in this width, the "counts" were 60's; if 100 noggs in its width, the clothing was known as 100's counts, etc. As previously stated, the "crowns" running lengthwise of the sheet, were always the same, viz., 5 per inch. It will be noticed from the above that the number of clothing indicated practically the points per sq. inch, or sq. foot.

For example, let us assume a piece of card clothing to be plain set, with 5 crowns per inch, and 25 noggs per inch, the points will equal 500 per sq. inch, and are obtained as follows:

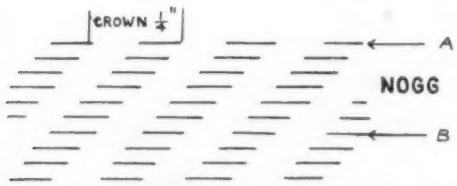
Noggs	25
Crowns	5
	125
Teeth per nogg	2
	250
Points per tooth	2
Points per sq. inch	500
	144
Points per sq. foot	72,000

The manner in which several text books explain the numbering of card clothing, is by stating, "that the clothing was formerly made in sheets 4 inches wide, and if there were 100 teeth in that width, the 'counts' equaled 100's;" they also proceed by stating that the number of teeth, or crowns lengthwise, was always 10 per inch," and while we

obtain the same points per sq. inch, the statement is misleading when carefully considered; for instance, the 10 crowns referred to, mean two rows of teeth, or one row of noggs running lengthwise; while the teeth referred to really mean noggs; therefore, to interpret



RIB SET
FIG. 4.



TWILL SET
FIG. 5.

PLAIN OR OPEN SET
FIG. 6.

it more plainly, it should read in such a manner that students will understand that these sheets had for 100's clothing, 5 teeth per inch running lengthwise, and 100 noggs (or groups of two teeth each) in the width of a 4 inch sheet. The points in this case being found as before, 100 nogs ÷ 4 inches = 25 noggs per inch, and 25 noggs × 5 crowns × 2 teeth per crown × 2 points per tooth will equal 500 points per sq. inch, 72,000 points per sq. foot in 100's clothing.

In other words, the "counts" × 5 equals points per sq. inch, or "counts" × 720 equals points per sq. foot.

In comparing the "English counts" with "American wire" method of numbering, reference may be made to the following tables.

It will be noticed that in every instance the English counts have a certain number of points, and no matter from whom the clothing is obtained, 100's counts will have 72,000 points per sq. foot, and other counts as follows:

60's = 43,200 points per sq. foot.
70's = 50,400 points per sq. foot.
80's = 57,600 points per sq. foot.
90's = 64,800 points per sq. foot.
100's = 72,000 points per sq. foot.
110's = 79,200 points per sq. foot.
120's = 86,400 points per sq. foot.
130's = 93,600 points per sq. foot.

In the United States it is customary to use the term "American wire" in lieu of "counts," thereby indicating the dia. of wire from which the teeth are made, rather than the points upon the surface; therefore with this method, it is possible to have two pieces of clothing of say 31's American wire, and one may contain several thousand teeth per sq. foot more than the other.

For example, the following tables published by different companies, show the amount of variation, with same number of wire.

Firm	No. 1	No. 2	Difference
28's wire	34,560	43,200	8,640 points
30's wire	41,472	50,400	8,928 points
31's wire	45,000	58,752	13,752 points
32's wire	48,384	65,664	17,280 points
33's wire	55,296	72,576	17,280 points
34's wire	62,208	79,488	17,280 points
35's wire	69,120	86,400	17,280 points
36's wire	76,032	93,600	17,568 points

From the foregoing tables it will be seen that the English system signifies a definite number of teeth, but the American does not; and the question now arises, as to whether some definite and uniform method cannot be adopted in this country, by which a person can represent card clothing by a system which always carries with it the definite statement as in the "counts" system.

I have observed also at least one firm has adopted a method of stating the number of noggs per inch in addition to the wire, and this seems to be a step in the right direction. While the English counts were practically based upon "plain set" clothing, it has been

adopted as representing the same points per sq. foot in "rib" and "twill" set; and when the points per sq. foot are given it is only necessary to divide by 720, and the "counts" is obtained.

While the "counts" system, as above explained, is precise in the general sense of designating the points per sq. foot, it does not indicate the style of setting, and in this particular it may be said to be defective, as we have now three styles as against one formerly.

It has occurred to the writer that the "noggs per inch" might be a good basis upon which to build a system of numbering; for instance, assuming that the "noggs per inch" may range from 10 to 30, why not let the "noggs" represent the "counts;" that is, if a piece of clothing contains 10 noggs per inch, let the "counts" be 10's, or again if 30 noggs are in one inch, the counts to equal 30's, and so on with other numbers.

The reader may, however, observe that the number of teeth per sq. foot on "plain," "twill," and "rib set," will also vary, if the noggs per inch are the same. This, however, could be remedied as follows:

For 10 noggs rib set, use the term "10's rib set."

For 10 noggs twill set, use the term "10's twill set."

For 10 noggs plain set, use the term "10's plain set."

The above would become just as familiar to the trade as saying 10's warp, or 10's filling, in referring to yarn.

In the above cases the points per sq. foot could be easily calculated, as with few exceptions the "rib" and "twill" have each 4 crowns per inch, and the "plain" or "open" 5 crowns per inch. Therefore the points per sq. foot in

Rib set will equal the noggs × 3,456.
Twill set will equal the noggs × 6,912.
Plain set will equal the noggs × 2,880.

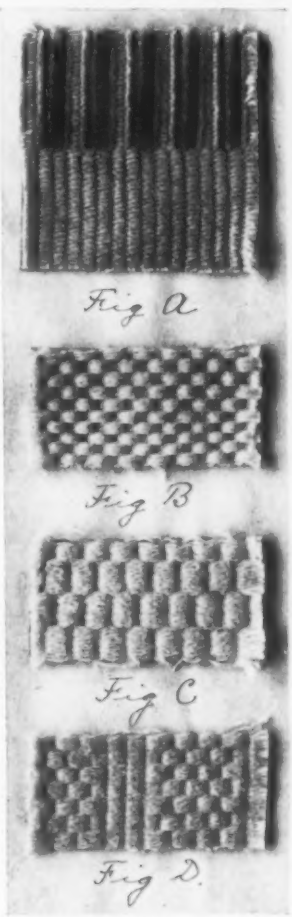
Assuming that the "noggs" equaled the "counts," a "20's rib set" would contain 3,456 × 20 = 69,120 points per sq. ft.; a "10 twill set" would contain 6,912 × 10 = 69,120 points per sq. ft.; a "25's plain set" would contain 2,880 × 25 = 72,000 points per sq. ft.

Knowing that the "Textile World Record" is ever ready to promote unification of terms, etc., wherever any confusion exists, I present the above suggestions for what they are worth to those interested in the subject of card clothing.

FANCY COTTON VELVETS.

BY ROBERT DANTZER,
Professeur de Tissage a la Societe Industrielle d'Amiens, France.

The pile of cotton velvets is made entirely from the filling. At the present time they comprise the most important part of velvet



fabrics, because of the very small quantity of woolen velvets that are now produced. As

is well known, filling pile velvets are woven with a ground weave on which the pile picks are floated and stitched at intervals. After the cloth is woven, these pile picks are cut along the centre of the float and the ends rising up form the pile of the velvet. The cutting process is done either by hand or by machine.

To facilitate the study of cotton velvets they may be divided into three classes: 1, plain; 2, corded; 3, fancy. The first two classes are well known and several writers have already treated them in extenso; for this reason I will not dwell upon them here.

The manufacture of fancy velvets is of comparatively recent date. At first the idea was to apply oblique cutting to corded velvets, that is to say, the knife instead of being held upright on the surface of the cloth, as is usual, is inclined alternately to right and left. Fig. A is a sample of this cutting, styled the Pueblo. The corresponding weave is shown at Fig. 1, the goods being known commercially as *cannele*. Fig. 2 is a cross section of the goods in the direction of the filling, before cutting. Fig. 3 is a cross section showing the usual method of cutting, while Fig. 4 shows the Pueblo cut.

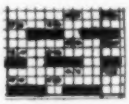


Fig. 1.

Fig. 2

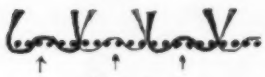


Fig. 3.

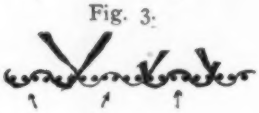


Fig. 4.

The workman must make three cuts for each pattern; 1, the knife is inclined from right to left; 2, from left to right; 3, perpendicularly. The upper portion of the sample at Fig. 1 has been partially cut; the third cut has been omitted that the oblique cuts may be more easily seen. Many workmen make the two cuts at one time by means of a double cutter having knives inclined in opposite directions. In that case the guides are soldered together, and the spaces separating them correspond to the distances between the cuts. One of the knives is of the usual length while the other is very short, about three-eighths of an inch. In this way the operation is accelerated. The Pueblo cut can be applied to corded velvets, and has been very popular for several years in France and Spain.

Figs. "B" and "C" are the oldest fancy effects known in the velvet trade and are known respectively under the names *grains de millet* and *grains de ble*. Figs. 5 and 6 are the weaves corresponding respectively to Figs. "B" and "C." It will be noticed that the pattern is made by offsetting the stripes at intervals, or breaking joints as it is called. The filling consists of 1 ground pick, 2 filling picks. Fig. 7 shows the method of cutting these patterns, the arrows indicating the path of the knife. The first time the cut is along the route marked A, the second time along

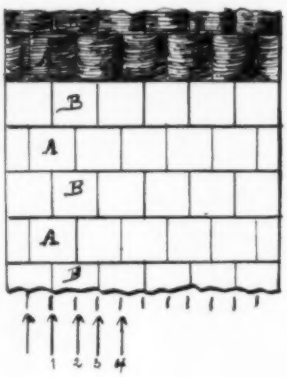


Fig. 7

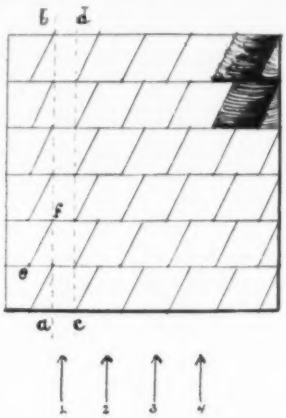
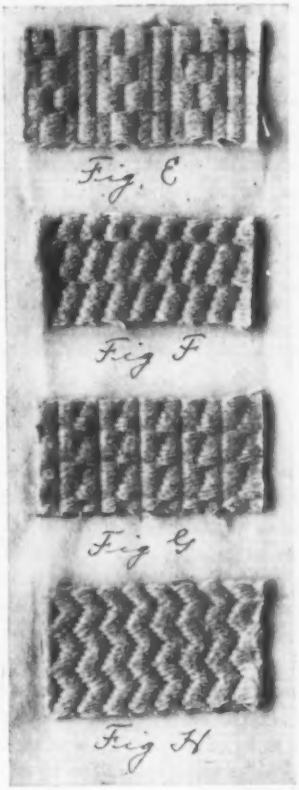


Fig. 8.

B, etc. Figs. D and E show effects obtained by combination of the cord with the grain pattern.

Fig. F is another fabric in which the pile picks are stitched along oblique lines, shown at e, f, Fig. 8. The pile is cut in the direction indicated by the arrows, 1, 2, etc. To permit the passage of the knife the pile picks are

not stitched between the lines a, b, and c, d; this space is occupied by three threads. By reference to Fig. 9 it will be seen that the pile picks are not stitched on 7, 8 and 9. This principle should be observed in the making of all filling pile velvets as it is necessary to



provide for the passage of the knife during the cutting process.

Fig. 9 shows a pattern in which the stitching is made alternately in straight and oblique lines as shown at Fig. F. Fig. 10 is the weave draft for this pattern, the cutting line being along the threads 3, 4, 5, 6, 13, 14, 15, 16. Fig. H shows the stitching lines disposed obliquely, first in one direction and then in another. Fig. 11 is the weave draft, the cutting line being along the threads 7, 8, 9. This has been the most popular style among fancy velvets. Fig. 1 shows a combination of the preceding pattern with a corded effect.

Fig. 12 is a weave draft for the sample shown at Fig. J. It will be noticed that the

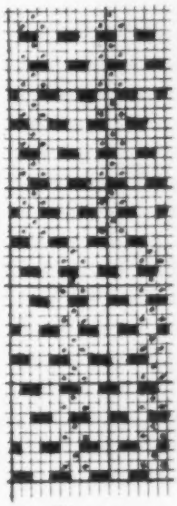


Fig. 5.

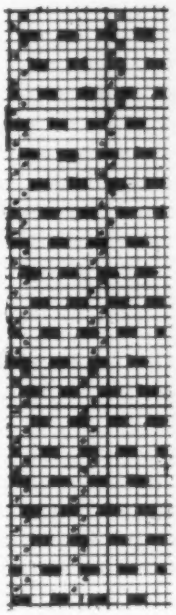


Fig. 10.

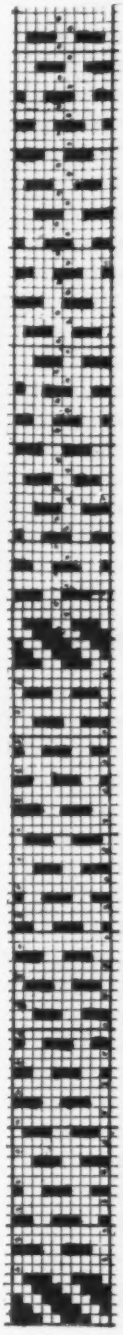


Fig. 6.

ground and pile picks are arranged irregularly as follows: 1 ground, 1 pile, 1 ground, 2 pile. The cutting lines are indicated by the arrows at the bottom of the draft.

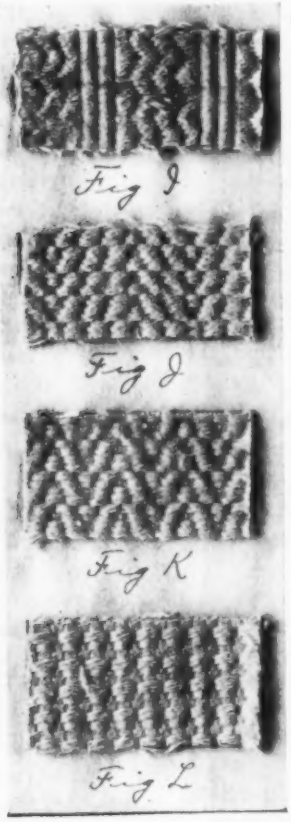


Fig. K is a sample woven with the weave shown at Fig. 13, there being four cutting lines in each pattern. The ground weave is a Batavia chevron, which is used to reduce the number of harness. Fig. 14 is the weave draft for the sample at Fig. L, of which the ground weave is a 3-leaf twill. There are two cutting lines in the pattern.

There is a vast variety of fancy styles in velvet fabrics, but the few samples we have shown will enable the reader to understand the method of manufacturing and to design new patterns as desired. Fancy velvets are used to a slight extent in central France, but are chiefly worn in Spain, where their manufacture is confined to Barcelona. In France they are sold by weight. The goods are woven 33 inches wide in the loom in order to give a width of 27 inches after dyeing. The pieces are 82 yards long, the weight varying from 28 to 99 pounds. The warp is

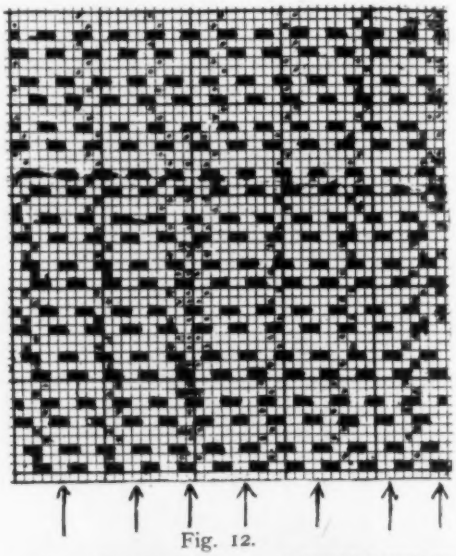


Fig. 12.

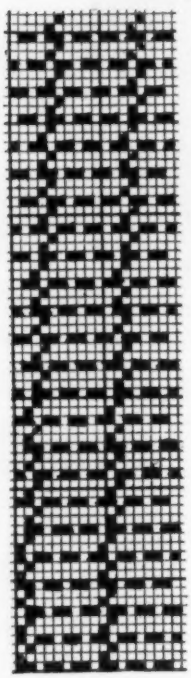


Fig. 9.

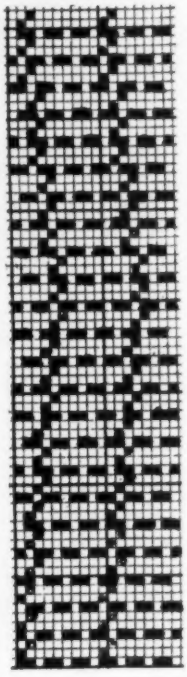


Fig. 11.

2 18's to 3/36's cotton (French counts) with 40 to 70 threads per inch. The filling is 1/12's to 1/30's cotton, twisted soft, 200 to 325 per inch.

With cotton at Havre costing 7 cents per pound, the cotton velvets before cutting will be valued at 30 cents per pound. These prices fluctuate between 27 and 32 cents per pound,

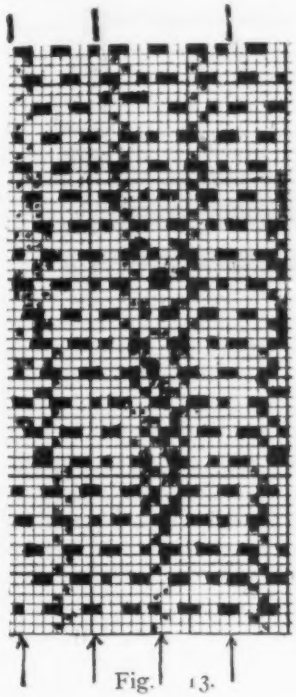


Fig. 13.

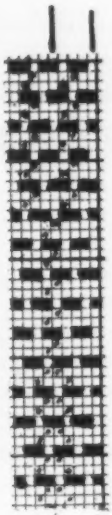


Fig. 14.

according to the demand and the price of cotton. Converting the raw cotton into yarn costs 12 to 13 cents per pound. The cost of cotton velvets per pound can therefore be estimated as follows:

Raw material	$0.07
Spinning	.12
Weaving	.11
Total	$0.30

Fancy velvets cost from 3 to 4 cents per pound extra.

It is estimated that $400,000,000 of British treasure lie sunk along the route from England to India.

GRINDING AND CARING FOR THE SHEAR.

BY ELMO.

To keep the shear in proper condition is a very important part of the woolen finisher's work; upon it depends not only the proper performance of this part of the work, but ofttimes the finisher's reputation.

It is not infrequently the case, that a man who has become efficient in all the other parts of the work finds himself embarrassed and hampered for the want of a better knowledge of the shear, and how to keep it in good working order.

In nearly all the other parts of the finishing room work, the ordinary help have an opportunity to learn from actual experience and close observation, so as to become reasonably well informed regarding the work.

But as the overseer usually takes charge of the detail of the fixing and grinding of the shear, it is quite impossible for one to learn the important and necessary points regarding this part of the work, unless the finisher shall see fit to take him into his confidence and give him the necessary instruction.

So it is often the case, that one who is, in other respects, entirely competent as a finisher, finds himself badly "stuck" on the shear, and thereby unable to hold his position.

Occasionally, a young man who has had an opportunity to learn the other parts of the work, and has also run the shear, and become thoroughly familiar with its construction, may, by "hook or crook," manage to master this part of the work; but indeed, the chances are greatly against him unless he has been given a few important points in the matter; and even with good instruction, it is quite important that one possess a mechanical turn of mind and good judgment in order to secure the best results, for failure often follows careless or hasty action.

The first important point, as already intimated, is to become thoroughly familiar with the machine and the various bolts and screws in and about the "shear head," or set of blades, which includes the revolver, ledger blade and back, to which it is attached, and the frame which holds them.

Without a proper knowledge of these screws and their uses and a careful adjustment as required in grinding and setting the blades, one cannot expect to succeed; for a slight turn of the wrong screw, or the right one in the wrong direction is likely to cause serious trouble.

shear, we may say that the regular six quarter shear has intermediate sets of screws between the outside and centre, as indicated by the letter A. So that the broad shear has five instead of three sets of these screws, extending across the shear equally distant from each other, and any adjustment of them

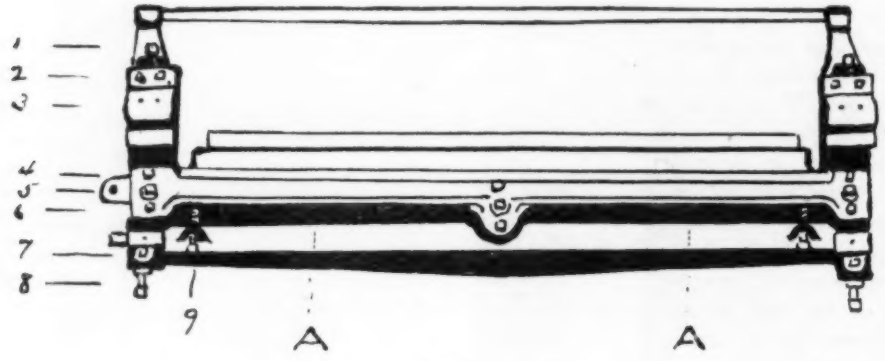


FIG. 1.

To give an idea of these screws and their various uses, we call attention to the accompanying illustration, Fig. 1, showing the back of the "shear head" with the revolver and vibrating attachment removed and the screws numbered in order to designate them.

No. 1 enters the top of the revolver box and is used to raise or lower the revolver when required.

The two screws marked No. 2 hold down the revolver box caps.

No. 3 cannot be seen in the cut, being on the front of the frame and passing through a slot into the lower side of the revolver box, serving to hold it in place.

Nos. 4, 5 and 6 serve to adjust the ledger blade and hold the back to which it is attached, securely to the frame of the "shear head."

No. 7 holds the "shear head" in place upon the main frame of the machine.

No. 8 serves to raise or lower the whole of the shear head when required.

No. 9 is to raise the ledger blade to a new position on the revolver when required.

It will be noticed that these screws have their duplicates on the opposite side, and Nos. 4, 5 and 6 in the centre as well; and as this cut represents the head of a narrow

by a careless or unskilled person is very likely to cause trouble.

The middle row of these screws, represented by No. 5, are called stay bolts, and screw into the frame below and serve to hold the ledger blade and the back to which it is attached in place.

The upper and lower rows,—Nos. 4 and 6, do not screw into the frame, but simply against it, so that the middle screws, while holding things in place, also serve as a pivotal point from which this part can be tipped by turning the top and bottom screws.

By turning the top row to the right the ledger blade is pressed to the revolver, while the similar turning of the bottom row tends to draw it away.

When the blades are in good running order, the pressure of the ledger against the revolver is supposed to be uniform all the way across, kept so by the proper adjustment of these screws, and in grinding, if the blades be true, it is very important that this uniformity be maintained, and if out of true, that they be adjusted in the grinding so as to make them true.

As a rule, all necessary adjustment of the ledger in grinding and running the shear may be made by the use of the top row of screws,

as the ledger may be drawn up to or let away from the revolver by the use of them; though at times it may be necessary to release the middle screws to allow an easy and effective action of the top row.

In preparing to grind the shear, first remove the swab and vibrating attachment; then give the blades a thorough cleaning; being sure to brush all flocks from between the fly blades of the revolver.

This being done, remove the caps of the journal boxes of the revolver and take the revolver out.

Clean off the back of the ledger blade, after which place a steel straight edge upon the edge of the blade to ascertain if it is perfectly true.

If it is found to be high in any particular place, keep it in mind, so as to begin the grinding at that point, and thus produce a true edge before proceeding with the grinding all the way across.

After getting a correct idea regarding the condition of the blades, the revolver should be put in place again. But before doing this, be sure and wipe out the journal boxes and put a few drops of oil in them, and see that the revolver shaft is perfectly clean. Put on the caps of the boxes and screw them down closely.

Sometimes, when the shear is new, the caps bind the shaft, in which case a piece of writing paper inserted under the cap will relieve it, and can be removed when found advisable.

Do not correct by allowing the screws to be loosened, but use the paper of sufficient thickness to allow the cap to be screwed down closely.

Now, as it is quite likely that the drawing up of the ledger blade at certain points since the shear was last ground may have caused an uneven pressure upon the revolver, it is important that it be made uniform before proceeding to grind, in order to be sure of uniform work.

Loosen the top row of screws all the way across, just enough so that the blades will refuse to cut dry paper, and it will be drawn down between the blades instead.

The point to be attained is to free the ledger from the revolver entirely, and yet remain as near to it as possible.

Now the bolts that hold the boxes in place (No. 3) should be loosened and those in the top of the boxes turned to the left in order to drop the revolver on to the bottom or "heel" of the bevel on the ledger.

When the blades are comparatively new, about one-half turn (half around) should be sufficient, but as the ledger is ground down, and the bevel consequently wider, it will require to be set back still more.

Care must be taken that both boxes are set back exactly alike, and that both the stay bolts are loosened before either box is lowered, and that both boxes are lowered before either one is made secure again.

In other words, do not change the position of one box while the other is secure.

Loosen both, lower both and then secure both. After this is done, test again with dry paper, and if the paper pinches between the revolver and the "heel" of the bevel, set the ledger off at that point until it is relieved.

Release the rod that drives the list motion, remove all belts, and cover all parts of the machine except the rest and blades, so as to keep them free from the oil and emery that will be used in grinding. Also set the blades back from the rest about twice as far as required for shearing a piece of heavy cloth.

Prepare a belt to run the revolver backward and the machine is in readiness for grinding. For grinding, a strop, Fig. 2,

FIG. 2.

FIG. 3.

should be made, using a piece of leather belting about three inches wide and twelve or fourteen inches in length attached to a wooden handle as shown in the cut.

The mixture for grinding is made by the combination of flour of emery and sperm or lard oil mixed to quite a stiff consistency.

Spread this mixture on the strop, and with the revolver turning backward apply the mixture to the revolver.

Now, by turning the top (No. 4) screw at one end of the blades, draw the ledger up until it barely touches the revolver, which can easily be determined by the sound. Then do the same at the opposite end of the blades, until both ends strike lightly and evenly.

Now draw up the middle of the ledger in like manner by the top screw.

If it be a narrow shear, you now have the blade bearing evenly all the way across. But if it be a broad shear, it will be necessary to draw the ledger up at the intermediate points between the centre and end screws.

As soon as the ledger touches at any point, and thereafter during the grinding process, the revolver should be constantly vibrated by hand, the full distance the journals will permit.

It must be remembered that owing to setting the revolver back, the grinding begins at the "heel" of the bevel on the ledger and a new bevel is being formed, until a slight turn of the edge shows that the grinding has reached that point. Apply the emery mixture every few minutes. As often as the sound of the grinding ceases, draw the ledger up very carefully and evenly all the way across, and so continue until the bevel is complete; which may be determined by the appearance of the turned edge and by testing, by the use of wet tissue paper, to see if the blades will cut all the way across. The turning of the edge may be very slight, and not visible, but can be discovered by touch.

Should the edge be turned at any particular point first, cease to draw up the ledger at that point until it turns all the way across.

By wiping off the front of the ledger, and sighting over the top of the rest, which should be as true as the straight edge, a careful examination will show if the ledger is being ground evenly. If it appears higher at any one point than at another, draw up at that point only, until it is even, then draw up all across alike.

It requires but a slight extra pressure at any particular point to cause the grinding to result in uneven work, and as the rest is supposed to be true, a careful attention, by frequent examination as the work proceeds, will avoid trouble. After it is certain that the bevel is complete, and the blades run lightly, the mixture should be made thin, and the ledger drawn up once or twice very slightly, then finish by running five or ten minutes with clear oil in place of the mixture.

The work should at no time be hurried, and the blades should run evenly, lightly and noiselessly before leaving off the use of the emery mixture.

When the grinding is complete, give all the parts a thorough cleaning, being sure to wipe all emery from between the fly-blades of the revolver.

This being done, remove the caps and take out the revolver, and clean the back of the ledger, and such parts as could not be cleaned while the revolver was in.

The next thing in order is the honing of the ledger blade.

Oil the face of the hone, and placing it on the ledger at an angle about as shown in the accompanying cut, Fig. 3, work it with a circular motion, very carefully, the entire length of the blade.

The first time across, work very lightly, so as to remove the feather edge on the ledger without turning it in the opposite direction.

Then go across several times; then lay the hone on lengthwise, keeping the same angle, and run it a few times the whole length of the blade.

Now be sure that boxes and journals are clean, put a few drops of oil in the boxes, and replace the revolver. Screw the caps down moderately tight, and be sure to turn the revolver the "cut way" first, so as to remove any feather edge that may have been produced in honing.

Now by a test the blades should cut wet paper all the way across.

In starting on the regular work, be sure that the swab is sufficiently well oiled, and do not lower the blades quite so much at a time as is usual, until after a few pieces are sheared, thus allowing the blades to get smoothed up before proceeding in the usual way.

After they have become smooth, it will not be strange if they will need to be set a little closer by drawing up the ledger; and this may be done at any time when the blades refuse to cut, provided they do not run hard.

When they are drawn up so that it is difficult to turn the revolver by hand, and they refuse to cut, it is not necessarily a sign that they need grinding. By an occasional setting off of the ledger, so that the revolver will turn easily, and still cut dry paper, the revolver may be removed and the honing repeated as above, and the blades made to do good work for a long time without grinding.

When the ledger is ground away so that the bevel becomes very wide, it is a good plan, after honing, to loosen stay bolts (No. 3) and by turning the screws in the top of the box (No. 1), thus raise the revolver. This lifts the revolver away from the "heel" of the bevel and brings it to the edge, so that the friction is lessened, and the result is equivalent to running on a narrow bevel; the revolver running more lightly, and the contact at the cutting point more certain.

When this is done, however, it should be kept in mind, and the revolver set back to its former position before another grinding, or a double bevel will be produced.

The directions here given agree with the method successfully pursued by the writer for twenty-five years. Though it may be said that sometimes, through carelessness or abuse, a machine will get into a condition that requires special judgment and possibly a divergence from all rules, in order to make it right; and if the blades become badly out of true, they can best be put in order by sending to the maker for repairs.

Density of Baled Wool.

Editor Textile World Record:

What is the density of Bagdad wool as imported in bales? How does its weight compare with that of water? Douglass (353).

A cubic foot of water weighs 1,000 ounces or 62 1/2 pounds. A bale of Bagdad wool recently imported measured 51 inches long, 17 inches wide and 17 inches thick: cubic contents, 14,739 cubic inches. The gross weight was 360 pounds, equal to 675 ounces, or 42 pounds per cubic foot. The weight of this bale was 32 1/2 per cent. less than that of water.

Questions and Answers.

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD RECORD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

For reply to questions that are not of general interest to readers of textile journals, such as those relating to the composition of yarns, analysis of fabrics, etc., we will charge the enquirer with the cost of the investigation.

Production of Woolen Finisher Card.

Editor Textile World Record:

Please state the best method of calculating the production of a woolen finisher card. I have calculated the production of our finisher cards from the weight of roving and size of doffer rings, but the results vary from 15 to 25 per cent. from the actual product. The outside diameter of rings is 11 3/4 inches. The doffer makes 14 turns per minute. We are using 11 rub roll condensers. The roving reels 1 1/2 runs as it comes from the condenser. There are twenty ends taken from each of the two doffers. Iroquois (342).

The error in Iroquois' calculation is evident from his explanation. He has neglected to take into account the draft of the roving by the condenser. At our request Iroquois has informed us that the spool drum at the finisher is 29 in. in circumference, and makes 21 turns per minute, showing a surface speed of 609 inches per minute. The surface speed of the doffer, which is 11 3/4 in. in diam., and makes 14 turns per minute, is 517 inches per minute, consequently the spool drum is 18 per cent. more length of roving than the doffer is delivering. This increase due to the draft of the rub rolls. Iroquois' error was due to his calculating from the speed of the doffer and the weight of yarn at the spool drum.

Taking the speed of the spool drum and weight of the roving at the spool drum as factors we calculate the production of the card as follows:

609 (in. per min.) × 40 (ends) = 677 yds. roving per min.

677 (yds.) ÷ 150 (yds. per oz.) = 4 1/2 ozs. roving per min.

4 1/2 (ozs.) × 60 (min. per hour) = 17 lbs. roving per hour.

Cloth for Typewriter Ribbons.

In reply to our request in the June issue for information regarding the manufacturers of typewriter ribbons, J. H. Lane & Co., 110 Worth St., New York City, advise us that they manufacture a line of these goods and will be pleased to quote prices to anyone interested.

Filling Waste.

Editor Textile World Record:

I have been much interested in your description of the Asala loom especially that part of it relating to the loss caused by the yarn going into waste instead of into the cloth. Is the two-thirds depreciation which you mention a fair average for all kinds of filling, including cotton, woolen and silk?

Mansfield (357)

The figures used in the article, 75 cents and 25 cents, were selected simply for illustration, we having in mind a 3/8 blood 2/36's worsted yarn which is worth today about 75 cents per pound; in the form of waste this stock would be worth about 25 cents per pound.

There are so many grades of cotton, woolen, worsted and silk yarn that it would be impossible to give an average of the difference in value of yarn on the bobbin and in the form of waste. This difference would have to be estimated separately for each kind of yarn and depends in a great measure upon the cost of the raw material; the higher this is the greater is the difference between the value of the yarn and the waste.

Depreciation is caused by inability to rework the waste into its original form. Take fine worsted yarn for example. This can be made only of long, fine combed wool. When once spun into the form of yarn it cannot be torn up and reworked into the same grade of yarn, but must be manufactured on the carded woolen system and spun into coarser and cheaper yarn, which is used for a low grade of goods.

As the value of the raw material is lowered, the margin between the value of the yarn and the waste from it decreases until a point is reached where the yarn waste is practically as suitable for reworking as was the material from which it was originally made. In such a case the loss caused by waste consists in the cost of converting the raw material into yarn. This is an important item, and includes not only the cost of the manual operations such as coloring, carding and spinning, but also the cost of fixed charges of the mill including rent, taxes, insurance, watchmen, repairs, interest, etc., as well as the loss resulting from decreased production caused by the yarn going into waste instead of into the form of cloth.

There is no doubt that if a careful estimate was made of the loss caused in the mills throughout the world by turning filling yarn into waste, some startling results would be reached. This is evident from the case of the small mill operating sixty looms, in which the loss due to filling waste amounts to $9,000 per year. Cotton yarn, unless twisted very soft, is of no value for reworking into yarn, and the same loss is very large on silk yarn. It would take much time and involve much labor and research to make even an approximation of this loss, which in the aggregate is enormous.

Filling waste is the most promising field for economy in the textile industry. The present wasteful methods are not seriously felt, because they have always existed. The only way to partially remedy the difficulty at present is for the overseer to give his personal attention to the matter, day in and day out. This is a very difficult thing to do, as it is impossible for an overseer to keep every weaver constantly under his eye. Consequently when the weaving overseer becomes unusually vigilant in this respect, the weavers are likely to pocket the waste, carry it out of the mill and destroy it. When the overseer comes around and finds a small quantity in the mill he is gratified at the showing, while the manufacturer is worse off than if the waste had been left in the mill to be reworked into other goods.

Best Results in a Cotton Spinning Mill.

Editor Textile World Record:

Please answer the following questions in your Question and Answer Department:

1. How many times should top flats with Sykes and American clothing on them be stripped during an 11 hours' run, carding middling cotton 7/8 staple, 160 pounds a day per card of 29's warp and 38's filling? 2. How should metallic drawing rolls be set for three processes on 7/8 staple middling cotton? 3. How should steel slubber rolls be set on 7/8 middling cotton to get the best results, and what draft is best on a .60 hank 7/8 staple middling cotton? 4. How should intermediate rolls be set on 7/8 staple middling cotton to get the best result and what draft is best on 1.65 hank roving 7/8 staple middling cotton? 5. How should fly frame steel rolls be set to get the best results on 7/8 staple Georgia and S. C. middling cotton? 6. Would a draft of 6 to 6.50 be too much on 5.00 and 6.25 hank rovings? 7. How much over standard twist should be put on 5.00 and 6.25 hank roving made from 7/8 staple middling cotton to draw well in spinning for 29's and 38's? How should spinning steel rolls be set to spin 29's warp and 38's filling out of 7/8 staple middling cotton? 9. Practically what are the turns per inch of twist to put in 29's warp yarn above standard to get the best results when the spindle moves 9,500? 10. Give me a quick method for stopping cockly yarn, stating in detail what causes it and how to overcome it.

Kilts (312).

The above questions have been referred to Ben Shaw, who writes as follows: A revolving flat card running South Carolina or Georgia middling cotton, 7/8 inch staple, producing 160 pounds per 11 hour day, to do its best work should be stripped at least three times a day, as this stock carries a large proportion of short fibres and the clothing

will fill up rapidly. If time could be spared I should be inclined to favor two strippings each morning and afternoon.

With 7/8 inch staple, metallic drawing rolls should be set as closely as possible. As these rolls are all of 1 1/8 inch diameter with the exception of the front roll, which is 1 3/8 inches, there could be no possible danger from a too close setting on the drawing frames. Experiments have shown that by substituting a front roll of 1 1/8 inch diameter allowing a closer setting at this point, the sliver will be considerably more even. The same remarks would apply to the setting of steel rolls on the slubber. A 50 grain sliver, with a draft of 3.60 would give good .60 hank roving at the front. The intermediate rolls should also be set as closely as possible, their diameters preventing too close setting for this stock. With two bobbins of .60 hank at the back and a draft of 5.5 the result at the front, 1.65 hank, should be very satisfying.

The fly frame steel roll diameters will likewise act as a guard against too close setting for this staple. A draft of 6 to 6.50 would be conservative on 5.00 and 6.25 hank roving. Standard twists for these weights of roving would be 2.68 and 3.00 turns per inch respectively. I should say they might be well increased to 2.77 and 3.10 turns. I would suggest a little experimenting at this point owing to varying conditions. The spinning rolls should be set at 15/16 inch for 7/8 inch stock. The twist should be increased to 26.12 turns per inch.

Cockly yarn is caused by the mixing of uneven staples. The receiving roll nips the longer fibres before they are released from the bite of the delivering roll. As a result these longer fibres break, snap forward and curl up, making the yarn uneven and weak. Look well to the mixing of the cotton, for it is more likely to occur there than anywhere else. If no variation of staple is in evidence in the picker then the spinning rolls should be gradually spread until the cockle disappears. This is bound to remedy the difficulty.

Following is a reply from another cotton mill man:

The questions asked by your correspondent are of a nature that would be best answered by a practical man on the spot, but I will take them as they come. How often to strip: This question is asked as though the speed of the revolving flats was for nothing else than regulating the stripping, like the stripper on the stationary card, but it is more than this; as they travel in a contrary direction to the cylinder they have much to do with cleaning as well as straightening the fibres, and as we will call this the greater it of course includes the lesser, so the safe way is to get all you can by the speed of the flats and rest assured the stripping will be taken care of, but even then much depends on the picking. With the new Swiss grids the beater may be reduced in speed, the cotton is not battered till the life is out of it, yet it is clean and the cards will do more work and clean too.

Setting of rolls: On all preparatory machines it takes experience to tell how to set them, for this is a thing for which there is no iron rule. With the same cotton, same weight of sliver, same kind of picking and carding, it is seldom that any two mills will have just the same setting, so the best plan is to start up one machine with the setting somewhere near what you think it ought to be, judging from the weight of the sliver you are putting through, its previous preparation and general surroundings; start just one spindle and adjust it so it gives the best satisfaction, not breaking the fibres, nor sending it through lumpy. If you are not a practical man hire one for the occasion, for you will never learn it from books, for the kind of cotton and the manner in which it is prepared changes what might be called best drafts and roll settings. Experiment on one spindle with what you have—old hands do this—then when you get down to the mule or frame spinning, the twist in the roving as well as the staple governs that. Drafts are generally governed in fairly old mills by the production you must get from them; you ought to manage at least 3 of a draft at both slubber and intermediate. I would let 6 be the limit of draft for both 5.00 and 6.25 hank roving, on that kind of cotton, which, unless prepared with extraordinary care, is very poor, for 29's yarn. I have spun hundreds of tons of 22's warp from 1 1/8 stock.

I suppose the 38's would be for filling and needing less twist even then would be poor. On this kind of stock the spinning frame rolls should not stand more than 15/16 inch, but you would have to experiment; for such cotton multiply the square root of counts by 4.75 to get twist per inch on warp, and by 4.20 for filling. Standards of twist for roving vary, but for this stock I would say, square root of counts multiplied by 2.05 would give ample twist per inch.

Cockled yarn: First see the cotton is picked and carded well, not too heavily drafted at any one place; have as little twist in the roving as will just carry to spinning rolls without breaking, keep out uneven or cut leather rolls; back, middle and front weights all set even; saddles and stirrups all free, and rolls oiled properly, but don't blame cockled yarn on the spinner when it was caused by badly prepared stock, roving too hard twisted and too much draft at the frame. If you put in 5 hank roving double for 29's warp on this kind of stock with 11.6 draft then don't blame the spinner for cockled yarn. Saul.

KNITTING DEPARTMENT.

For Knitting Mill Machinery, Equipment and Supplies, see pages 232 to 253. Also Buyers' Index.

KNIT GOODS SITUATION.

Last year at this time a large proportion of the season's light weight underwear had been sold, but a reverse situation presents itself at this writing. Some few sellers have been out and taken some business, but it cannot be said that the prices are fixed for the season as yet. Considerable manipulation of yarns is necessary in order to make goods at last year's prices, and in consequence of this most manufacturers are willing that the other fellow should show his hand first. We have heard one manufacturer criticise the two or three who showed the low priced men's balbriggans in the month of June, saying it was impossible for them to figure to make the goods at the prices asked. He referred particularly to a line showed at $1.80, which is an advance of 10c. per dozen over last season's price. Another manufacturer who sold his goods last season at $1.75 is now asking $1.90. It is admitted on all sides that men's balbriggans at $1.90 or less offer a very uninviting field for a manufacturer and it is feared that the unsatisfactory experience of the past season in the matter of delivery will be repeated in 1904.

We have heard of two or three manufacturers carrying over small stocks of yarn, which will enable them to take on a small amount of business at or near last year's prices, but the amount is insignificant, and when it is necessary to go into the yarn market to buy, no reliability can be placed on any price made. So far there has been no lines of men's balbriggans at 50c. shown.

On account of the light weight of ladies' ribbed vests, the cost of stock does not enter into the price as much as in men's goods, and there is therefore a smaller percentage of advance.

We do not hear of any lines being shown at last season's prices except some mercerized goods at $3.25. One manufacturer who shows a line of lisle thread and mercerized goods is asking $1.85 for goods shown last year for $1.80. He shows some new stitches in all over lace patterns, also a new full bust pattern, which promises to be a good seller. It is made by changing the stitch for about four inches from the top of the garment, which gives it a greater elasticity at this part. The line of lace trimmed lisle combination suits and pants shows an advance of about 5 per cent. A new feature of this line of pants is that they all are made without the sateen bands that we have been accustomed to for some time, but are made with a fine stitch at the top and buttoned at the sides or with a hem and a draw-string drawn through like an equestrian's tights.

A manufacturer of men's ribbed goods is now showing a line of shirts and drawers at $3.62 1/2 net, in cotton, and $7.00 in lisle, and reports having booked considerable business. The cotton goods have the appearance of being made of tinted American cotton. The drawer is made with a new adjustment feature consisting of tapes attached to each side of the band and drawn through eyelets, to be tied as desired. This manufacturer also shows knee length loose fitting drawers without cuffs, the idea for which we suppose was taken from the muslin drawers of the same shape now being shown by New York retailers.

We are advised by some retailers that there has been some demand for men's combination suits with drop seats and manufacturers of men's suits will do well to show samples made in this way in their line. We notice that nearly every manufacturer of ribbed underwear is showing samples of ladies' corset covers, and we are told that the business on this line has increased considerably in the past year. We were privileged to examine a line of these goods and our attention was called to some new features. They are made with the fine stitch,

with the back of the garment made of one and the front of two pieces of cloth. The two front pieces are cut circular along the edges where the buttons and button holes are placed, this giving plenty of bust room and presenting a selling argument to the consumer. Another feature of this garment is a piece of tubular knit fabric sewed on flat down the entire length of the garment with a button hole at the bottom to fasten undergarments on if desired.

FANCY KNIT GOODS.

There is an increased demand for novelties in the knit goods market and so great has the sale become that larger stores have given up considerable space to departments for the display and sale of fancy knit goods exclusively. The American woman is now giving much attention to outdoor sports and as a consequence we have the golf vest, golf blouse, basketball sweater and automobile sweater in great variety. In wool goods handsome golf blouses are being shown in plain colors and combinations. Most of these are made with bishop sleeves and straight front effects. The automobile sweater is made from fine zephyr yarns, buttoned down the front. Are light weight, but warm.

Many new designs are also shown in men's sweaters; among them plaid patterns and polka dot effects, and the same are selling well, particularly in the better grades, up as high as $75 per dozen.

HOSIERY.

Sample lines are all complete and some orders have been taken, although there is still some lagging back on the part of the more conservative manufacturers. Judging from the lines so far shown, there is an indication that lace hosiery to sell at 25c. will be the same strong feature that it was last season, and there seems to be no end to the variety of stitches being shown. Light weight cottons and lisles are also very much in demand, and the domestic manufacturers are showing these lines to retail at from 25 to 50c., in qualities which it will bother the German manufacturers to match.

It looks as if some domestic manufacturers were laying awake nights thinking up ideas for something new, and as a result of one we have seen today a ladies' black hose with a narrow piece of satin ribbon sewed down the sides with a bow at the top, that can be retailed at 25c. a pair.

CHEMNITZ REPORT.

The situation here is still unsettled. The orders booked call for comparatively large quantities, when the high costs are considered. Yarns are still advancing, with prospects of still further advance, and those buyers who have placed orders are better off than those who wait for further developments.

Stocks of Egyptian yarns are depleted by manufacturers of mercerized cloth and American cotton is being used largely by hosiery yarn spinners in its stead.

Large orders have been placed on plain staple hosiery and in many cases buyers had to be content with lighter weight goods made from American cotton at same prices as formerly for heavier weight maco yarn goods. Gauge weights continue to be sought after, particularly the better grades.

Split sole goods for ladies are well sold up for the year, and in this line buyers have taken quantities that would not have been considered at all in former years. Plain black lace hose are not much called for except in better grades. Those with silk embroideries are selling well, both in lower grade with machinery embroidery and better grades with hand work. Small effects are preferred and lately small flowers are taken in preference to dots, etc.

There is also a demand for plain gauge cottons and lisles with embroidered work. Men's embroidered goods also continue in good demand, and at present there is call for misses' bleached ribbed hosiery both for immediate and spring delivery.

In gloves large orders are being placed for silk tipped goods, and although prices are higher, better grades are selected, mostly with two clasps, the lower grades with vegetable ivory and the better with pearl.

Silk gloves and mitts in 20 inch length with lace tops are being bought freely.

CALCULATION OF THE COST OF KNIT GOODS.

BY F. W. HERINGTON.

The calculation of the cost of knit goods to be exact is quite a difficult matter, for the reason that every mill makes several different qualities of goods, and to arrive at an exact cost on any one of them is almost an impossible task, so many different causes operate to make the cost of goods either more or less. One of these causes is production. This factor of production is the most important item and enters very largely into the estimate of the actual cost of goods.

For example, we will suppose a mill has a capacity of 200 dozen per day, and that the daily expenses for superintending, office help, engineer, watchman, insurance, etc., is $30 per day, this would make the cost per dozen for these fixed expenses, 15c. per dozen, but if the mill from one cause or another should only produce 100 dozen per day, then this cost per dozen would be 30c., and if the line of goods on which the mill may be running does not show a margin of 30c. per dozen over and above all other costs and expenses, then the mill would be running at a daily loss instead of a profit.

Therefore this factor of production is the vital one in the success or the failure of a mill.

The only conservative way, therefore, to arrive at a safe estimate of cost of goods, and especially the labor cost, is to have a daily report from each department of its production, and these reports sent into the office every day and entered in a book especially printed to suit the requirements of the mill.

The totals of these reports are added up every four weeks or every month, and then the amounts paid out for wages in each department put down opposite; from these two items can be figured the cost per pound or per dozen, according to the production, of each process of manufacturing, by dividing the total amount of wages by the total production.

Then to be more exact, and to arrive at a closer estimate, these monthly estimates can be tabulated every six or twelve months, and a closer average cost per pound ascertained, and compared with the monthly tabulations of cost. They will undoubtedly vary every month, and also every six months, but this is the only way in which a safe calculation of cost can be reached.

A method of determining the cost of any particular line or style of goods in a mill making their own yarn is to have a batch started at the picker room, and a careful record kept of the weight of all raw stock put into it; it is then followed through the card room, keeping track of the waste and card cleanings that are carried back; the roving is weighed as it comes from the finisher and delivered to the spinning room, the spinner keeping track of how many pounds of yarn spun out of the roving, together with

April 19 1903

Picking Room

Batches		Shoddy Picker
	lbs	lbs
Wool	942	125
Cotton	320	150
Shoddy	425	
Waste	280	
Totals	1967	275

George Roberts Foreman

FIG. I.

the waste in spinning, and the amount of waste left on the spools of roving at the end of the batch. The knitter keeps track of the number of pounds of cloth knit from this lot of yarn, together with the waste from winding, and the yarn waste in knitting. Then the cloth taken to the cutter is noted and a record kept of the quantity of shirts and drawers cut out of the whole lot of cloth knit, the waste carefully being weighed from the cutting.

By this method is ascertained just how much waste goes back in carding, how much is made in spinning, how much is made in

winding and knitting, and how much is made in cutting the cloth into shirts and drawers.

Divide the number of dozen of shirts and drawers cut into the number of pounds of the batch of raw stock put on, and you arrive at the exact number of pounds of raw stock necessary to go through in order to produce a dozen of goods, providing, of course, that the batch through all the processes has been run with the least possible waste, giving credit at the same time for the value of all the waste carried back from all the departments.

This method, then, enables a manufacturer to calculate the exact cost of the raw material which goes into any one line or style, by the pounds to the dozen of goods. To this then has to be added the average labor cost of each department per pound or per dozen, and then the average cost for fixed expenses based on the average production per day. The goods from this one batch could also be followed through the finishing room and a record kept of the amount of the material used in finishing the lot, and thus ascertain the cost of the material in finishing any one style.

In this way the cost of goods coming through the mill from the raw stock can be ascertained very closely, but the whole question of cost rests on the average production per day, and this is where the difficulty comes in, as the daily production sometimes varies considerably.

A main belt may break, something may go wrong with the engine, and numerous things may happen that will lessen the production some days, and so the only safe way for a mill is to keep a daily record of the production of each and every department, and take an average every month, and then again every six and twelve months, and from these averages base the estimate of cost.

For example, in a mill with an average production of say 700 dozen per day, the calculations of cost have been on that average and the selling price, if the production should drop to say even 600 dozen per day, be running at a daily loss. For the reason that the fixed expenses as they are called are not reduced in the slightest when the production has dropped, nor increased when the full quantity is made.

April 10 1903

Spinning Room

Name	Mule No	Fine lbs	Med lbs	Coarse lbs			Total
Geo Brown	1	40	126	20			186
J. Robinson	2		290				290
F. Smith	3	60		230			290
Wm Jones	4		300				300
Chas. Roberts	5			490			490
John Ryan	6	100					100
						Total	1636

John McCarthy Foreman

FIG. 2.

Starting from the picker room, therefore, each batch of stock has to be weighed, and a record kept of the batch, it is not a difficult matter to have a printed slip and the number of pounds picked each day for the cards set down, and handed into the office and entered in a book.

In mills where they pick their own rags or clippings, through a shoddy picker or gar-

nett machine, a daily record can be kept of the number of pounds picked, and thus arrive at the cost per pound for picking.

In the card room it is not easy to keep a record of the number of pounds run through the cards, but as the picker room does not usually pick on the average any more than what the cards will put through, this can be taken from the same record.

April 10 1903

Knitting Room

Mach No	Size Cyl	Style No	lbs	Mach No	Size Cyl	Style No	lbs
			48				45
			46				42
1	20	436	49	9	18	436	46
			57				52
			55				51
2	18	308	52	10	20	308	
			36				58
			38				62
3	17	200		11	21	200	
			62				66
			60				61
4	20	405	64	12	22	200	
			58				39
							41
5	21	436		13	17	436	37
			25				40
			37				41
6	15	436	32	14	16	305	36
			46				56
			44				53
7	19	305		15	20	200	57
			67				60
			65				54
8	22	305		16	21	305	
Total			951	Total			997

Frank O'Brien Foreman

FIG. 3.

In the spinning room where the spinning is piece work a record has to be kept of the number of pounds each spinner takes off his mule, therefore it is quite easy to have a record kept on a printed slip of the number of pounds spun each day. In the knitting room the winders being generally on piece work, a record has to be kept of the number of pounds each girl winds, and this record serves also for the cost statement.

A printed slip should also be provided for the knitting, and the number of pounds of cloth of each and every roll put down. These records give the manufacturer a basis on which to figure his cost and from them he can tell if any one department is losing or gaining.

In the cutting room a daily record should be kept of each roll cut, the number of dozens cut and the amount of waste from each roll. This will also show whether the knitting is coming good or bad and by following these records every day the superintendent can tell if the knitting is coming through as good as it should.

The number of goods cut very nearly represents the daily production of a mill, provided the cutter keeps all the cloth cut up as fast as it comes from the knitting room. The amount of goods finished may be less than the daily cutting, but if so then the finishing room is falling behind, but the goods having been cut, the mill has the quantity of goods which have been cut, but in an unfinished state.

April 10 1903

Cutting

	Dozens Cut Shirts	Dozens Cut Drawers	Waste lbs
Wool	56	34	120
Cotton	42	57	49
Fleece	38	36	80
Totals	136	128	249

John Smith Foreman

FIG. 4.

A book should be printed to correspond with each of the slips of the daily reports.

All reports should be signed by the foreman of each department, thus making him responsible for the correctness of the same,

April 10 — 1903

Finishing Room

Total Doz Seamed		Total Doz Finished		Total Doz Boxed		Total Doz Shipped	
S	D	S	D	S	D	S	D
78	70	60	75	80	75	100	100

John Smith Foreman

FIG. 5.

and also bringing it directly to his knowledge, and if his department is not producing what it ought, he is thus made aware of it.

Fig. 1 shows the picking room report.

Fig. 2 shows a spinner's daily report for a six set mill having six mules. This can be used for the spinners' time and for the amount of yarn spun by each man on piece work. It also shows the amount each mule is producing each day, as well as the total number of pounds made, and also covers the different weights of the yarn classified according to the price paid per pound.

Fig. 3 is a report for a knitting room having sixteen machines with cylinders ranging from fifteen to twenty-two inches diameter, each of which should be numbered.

Then ordinary shipping tags, or some printed specially for the purpose, are used, on which are put the date, style number, the number of the machine and the size of the cylinder and weight in pounds. The size of the cylinder enables the dryer to know what size spreader to use to dry the cloth to the desired width. Spaces are left for three rolls of cloth to be taken from a machine in one day. This form can be modified to suit the requirements of the mill.

It serves a three-fold purpose: First—It is a daily record of the production in pounds of the whole knitting room, from which the time of the knitters can be copied; Second—It shows from day to day the daily production of each machine separately; Third—By the use of the corresponding tags, it makes it easy to trace back to the machine which may be making inferior cloth.

Fig. 4 shows a report of the number of dozens cut each day; by having the waste weighed each day it will show the amount of waste per dozen cut, thus indicating whether the work is running well or not.

Fig. 5 is the finishing report. These totals are easily obtained by the foreman himself going around each morning to each of the seamers and finishers and ascertaining from each one the number of dozens done the day previous. In this manner, he finds out at the same time, which girls are the best workers, and if one is not doing as much as she ought he is aware of it at once.

Fig. 6 shows the form for the report book. In this book the totals with the amount paid out for labor in each department are entered

Form of Book for Entering Daily Reports.

Date 1903		Picking Room				Ready Cards	Total Taken	Spinning				Total Taken	Knitting				Total Taken	Finishing				Total Taken	Coal	Repairs	Oiling	Incidentals	Amount
April	10	943	320	425	250	275		200	700	320		1948	135	138	200		148	135	155	200							
"	11																										
"	12																										
"	13																										
"	14																										
"	15																										
Total							$4.00																				

FIG. 6.

every week, or every two or four weeks as desired.

The pay roll, or time book, should be kept classified with the names of the help in each department, to correspond with the reports, and with this book. This total is entered in the book at the end of each week. Additional columns can be added at the side of each department to put in the total of the reports. This form will enable almost any manufacturer, who has not already a system of this kind, to have one printed to suit his own requirements.

To further show the calculation of costs we will start at the picker room with a 400 pound batch for all wool goods:

300 lbs. wool at 18c.	$54.00
75 lbs. cotton at 9c.	6.75
25 lbs. shoddy or waste at 5c.	1.25
6 qts. oil at 20c. gal.	.30
	$62.30

$62.30 divided by 400 equals 15 58/100 cents, cost per pound of the raw stock.

HELP IN PICKER ROOM.

2 men at $1.25 per day	$2.50

HELP IN CARDING ROOM.

"Boss" carder, per day	$2.50
Second hand, per day	1.50
2 cleaners at $1.00 per day	2.00
6 boys at $2.50 per week	2.50
Per day	$11.00

The above quantity of help is about what would be required in a six-set mill.

Average daily amount of stock put through the pickers and cards, say 2,000 pounds.

$11.00 the total amount of wages per day, divided by 2,000, gives 55/100 cents as the labor cost per pound for picking and carding.

SPINNING ROOM.

Spinning is usually piece work; we therefore take the price per pound, which say for 30 grain yarn would be about 50 cents per 100 pounds, or 50/100 cents per pound, and add to this the cost for the overseer and his help.

The 400 pounds of raw stock from the card room has lost say about 10 per cent. in waste in carding, which goes back in another batch as shoddy or waste.

Therefore in counting spinning cost we deduct 10 per cent. from the card room daily production, 2,000 pounds less 10 per cent. equals 1,800 pounds.

"Boss" spinner	$2.50
2 boys at $2.50 per week	.81⅔
Per day	$3.31⅔

Average daily pounds of yarn spun, 1,800 pounds.

$3.31 2/3 divided by 1,800 equals $0.1842, to which is added the 50/100 cents for the spinner, making $0.6842, the labor cost per pound for spinning.

WINDING AND KNITTING.

Winding is piece work by the pound and for 30 grain yarn would be about 25 cents per 100 pounds or 1/4 cent per pound. Knitting is piece work by the pound in some mills, and in others day work. If the former, it can be figured as in the spinning room, and if the latter, the same as for the card room.

Add together the daily wages of all the help and divide by the average daily number of pounds of cloth knit, then by taking the number of pounds of cloth it takes to cut one dozen goods, including the waste in cutting, the cost for knitting per dozen is obtained.

The number of pounds of cloth will be less than the pounds of yarn, as about 1 per cent. will be waste in winding and knitting.

One per cent. from 1,800 pounds equals 1,782 pounds.

"Boss" knitter	$3.50
4 girls at $1.00 per day	4.00
1 helper at	1.00
1 boy at $2.50 per week	.41⅙
Per day	$8.91⅙

$8.91 1/6 divided by 1,782 pounds equals 50 cents per pound labor cost per pound for knitting.

In addition to these labor costs, there has to be added the cost for repairs, such as belting, lace leather, ropes, etc., in picking, carding and spinning rooms, and needles and needle metal in knitting room.

All mills should keep a separate account in their ledgers for "Repairs" and "Expense" to which everything that is used is charged, and by taking the total for say six months or a year, and then dividing the amount either by the total number of pounds of cloth made, which will give the cost per pound or by the number of dozens of goods finished, would give the cost per dozen.

The cost per dozen for washing, scouring, drying and boarding can be ascertained in the same manner, to which would have to be added the average amount of materials used, such as soap, etc.

FINISHING ROOM.

Nearly everything in a finishing room is piece work, and costs very little on different styles.

By adding the total of all the operations according to the coupons, and taking the total daily wages of the day help such as the "boss" finisher and others, and dividing by the average daily production, the total labor cost of finishing is calculated.

Having tabulated all the labor costs through the different departments, we have yet the "fixed expenses" of the mill which do not decrease if the production is decreased, but remain the same, such as salaries of manager and superintendent, office help, engineer, watchman, insurance, coal, etc.

The average cost per dozen for these fixed expenses has to be figured and based upon the average daily, monthly, or yearly production of the mill, as already shown.

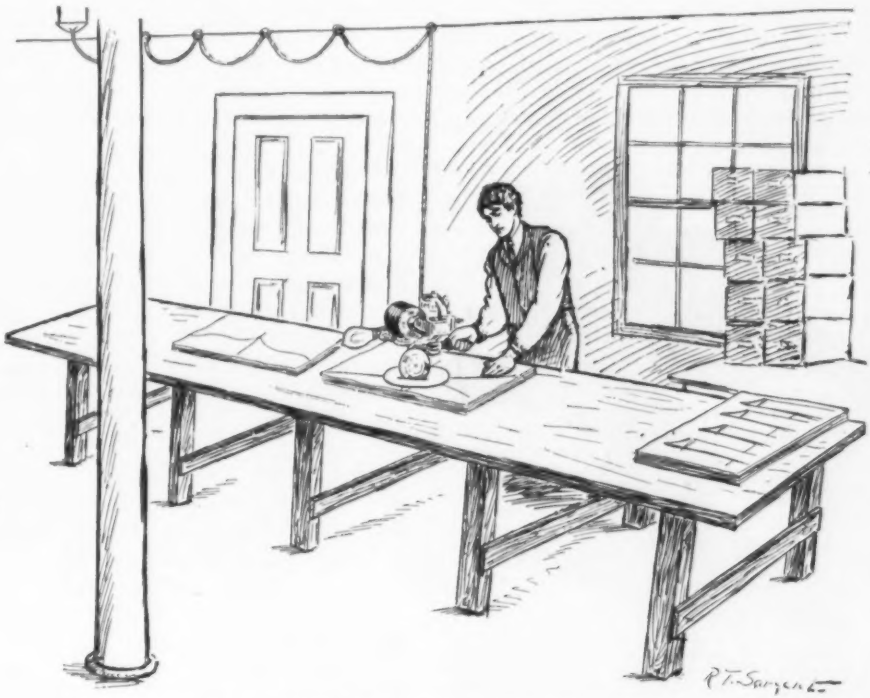


FIG. 1. METHOD OF USING THE "UNIVERSAL CUTTER."

ELECTRIC CUTTING MACHINE FOR KNIT GOODS.

The accompanying illustration, Fig. 1, shows a table equipped with the Universal Electric Cutting Machine, built by the Universal Cutter Company, St. Louis, Mo. The machine is very compact, light in weight, and well adapted for cutting all grades of knit underwear in lays from 1/2 to 4 inches in thickness. The manufacturers claim a greater quantity and better work than by any other method. The machines are pro-

vided with circular knives and are made in three sizes.

The "Gem" has a 3/4-inch knife and the machine weighs but 15 pounds. It cuts lays from 1/2 to 1 1/2 inches thick.

The "Prima" has a 4-inch knife and weighs 24 pounds, cutting lays up to 2 1/2 inches thick.

The "Giant" has a 5 1/2-inch knife and weighs 26 pounds. This size is adapted for cutting lays up to 4 inches thick.

The "Prima Special" is said to be the most powerful machine on the market for cutting silesias, sateens, and hard goods.

This company also manufactures straight knife machines, which for some purposes are better adapted to do the work. To those having need of this style machine, full particulars will be supplied upon request.

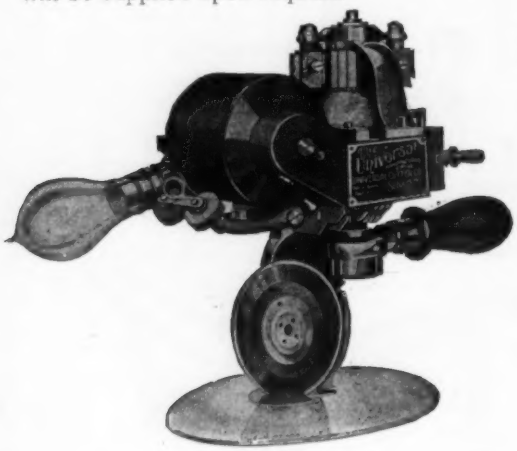


FIG. 2. UNIVERSAL CUTTER.

For this system of cutting a long table 54 inches wide is required, the longer the better. A wire is stretched above the table close to the ceiling. The electric cord carrying the current to the machine is supported and slides on this wire, as shown in the illustration. The sections to be cut into sleeves, drawers, or sateen facings, are laid and marked on this table, and without being moved are cut by the machine. By this method much time and labor is saved which is now consumed in bringing the sections of goods to the long knife or stationary machine, during which operation they are often disarranged and require straightening out before the cutting can be done.

In cutting sleeves a long row of sections can be placed on each side of the table and in this position marked and cut. The goods are then laid on trucks to be carried to the next process.

In cutting drawers a long row of sections is placed on either side of the table, then marked and cut with the machine. A cutter follows the machine and with a pair of shears shortens the fronts, after which the goods are loaded on trucks and delivered to the next department.

In cutting silesias and sateens for facings the goods are placed in lays four or five yards long, or even longer; they are then marked and cut according to the patterns, 48 to 120 thicknesses being cut at one time. By using long lays the goods are cut to better advantage.

Fig. 2 is a separate view of the machine. The main office of the Universal Cutter Company is at 4567-4569 Scott Ave., St. Louis, Mo. The Eastern department is in charge of Frederick Baumann, Jr., 467 Broadway, New York City, who will be pleased to supply further information regarding the machine. To facilitate matters it is suggested that manufacturers, when writing for particulars, send a sample of the goods to be cut, stating the number of ply it is desired to cut at one time. In this way the company will be able to decide which style is best adapted for the particular requirements of each manufacturer.

Mantle for Gas Light.

Editor Textile World Record:

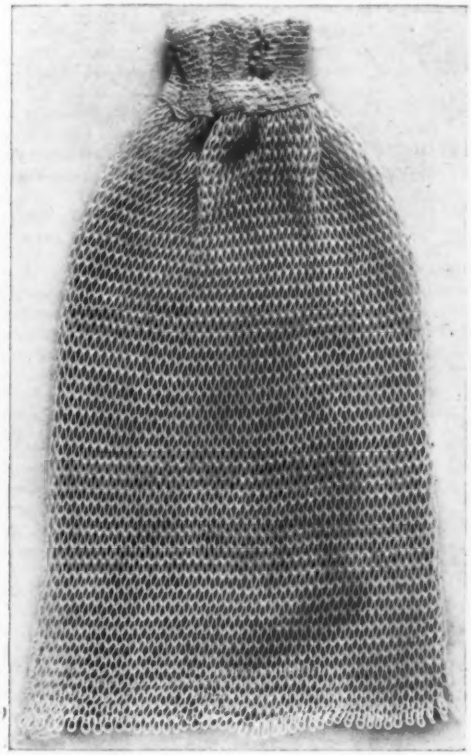
I would like information regarding the method of manufacturing the mantles used for incandescent gas lights. Mantle (359).

Our English correspondent sends us the following particulars regarding the manufacture of mantles for gas lights, together with a mantle made in Nottingham, England, and shown in the illustration, from which an idea of their mesh can be obtained:

"The knitted tubing used for mantles for incandescent gas lights is cut into lengths from eight to nine inches long. Each of these pieces is folded and sewn at the top with a loop of asbestos thread. The mantle is then immersed in a solution of nitrate of thorium and cerium, dried, and the cotton burned out. In this way the nitrates are transformed into oxides and the shell is then stiffened

and ready to be packed into boxes for sale. The mantle shown in the illustration has been dipped in the nitrate solution."

This mantle is made from three strands of two-ply yarn twisted together, making a six-ply thread. Ten grains of the yarn measure 14.4 yards in length; this would be equal to 1.44 yards per grain. As



KNITTED TUBING FOR MANTLES.

the count of cotton yarn indicates the number of .12 yard lengths in one grain, the number of the yarn in the mantle is 1.44 ÷ .12 = No. 12 (hanks per grain). Without allowing anything for take-up in twisting, this would be equivalent to 6/72's.

RECENT KNITTING PATENTS.

KNITTING MACHINE. 729,005. Bernard T. Steber, Utica, N. Y.

This invention relates to improvements in knitting machines. It has particular relation to the kind of cams which are employed in raising and depressing the needles of the machine and consists in certain novel constructions, combinations, and arrangements of parts.

These improvements are designed to enable one with a machine of ordinary construction to produce a strong and fancy knitted heel or toe in a stocking, sock, or the like. The stitch which is best to use is produced by allowing only a portion of the needles to rise high enough to release their latches from their loops and take yarn for one course of

Fig. 1.

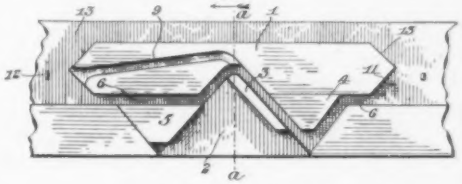
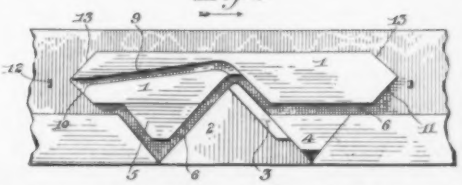


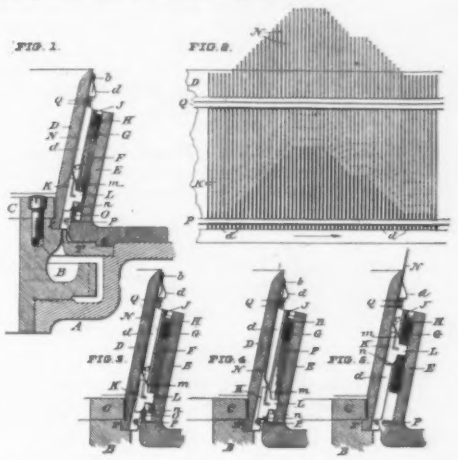
Fig. 2



stitches, as in knitting a heel, while the cam-ring revolves in one direction, and to allow all of the needles to take yarn and knit for the course of stitches immediately following, the cam-ring having been reversed and moved in the opposite direction to form the said latter course of stitches. With needles having long and short heels are used guides or cams particularly adapted for actuating the same.

KNITTING MACHINE, Needle Actuating Device. 729,075. Frank Lasher, Bennington, Vt.

This invention embraces improvements in the construction of circular-knitting machines, and relates more especially to novel features in the construction, combination, and mode of operation of rotating needle-cylinders, needles, needle-actuating jacks, and needle-actuating cams.

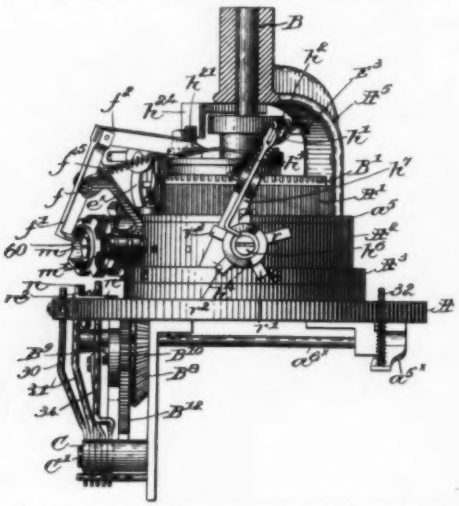


It is applicable to machines in which each needle has an independent longitudinal movement in its groove in the needle-bed and is connected with a driver which also occupies the same groove and

is variously known as a "bit" or "jack," which has a shank, wing, or lug which projects beyond the surface of the needle-bed by or through which it is driven by cams over which said lugs pass in contact or from a closed cam-race in which they travel. In some machines the needle-bed is stationary and the cams move over the jacks and in others the cams are stationary and the needle-jacks move over the cams. This invention is equally applicable to either of these systems.

KNITTING MACHINE. 728,465. Leon C. Huse, Laconia, N. H., assignor of two-thirds to Warren D. Huse and Walter L. Huse, Laconia, N. H.

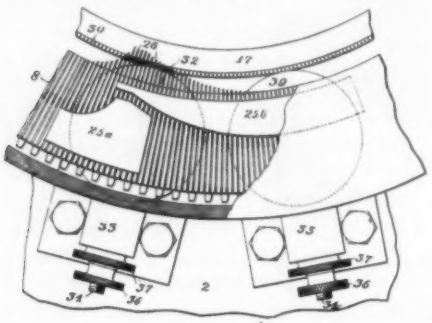
This machine is adapted to supply to either a plain or a rib-knitted fabric a second or reinforcing thread and also to lengthen the stitch auto-



matically, to make one or more slack courses on the cylinder needles while plain knitting is being done, these slack courses constituting a line to aid in separating the fabric and also to present loops to be subsequently picked on other needles of a footing or other knitting machine.

KNITTING MACHINE, Circular Rib. 729,074. Frank Lasher, Bennington, Vt.

This invention belongs to that class of machines



designed to produce tubular ribbed work for bodies of knit garments. It is designed to combine in one machine, by novel and improved construction, all the advantages which are characteristic of the use of two sets of barbed spring-needles, sinkers instead of bur-wheels to sink the stitches, and rotary instead of stationary pressers to press the needle-barbs. The peculiar construction of one needle-cylinder and one set of the spring-needles in this machine renders the use of sinkers entirely feasible, while the relative arrangement and disposition of the cylinders and the sinker-case permits the use of a rotary presser-wheel for each set of needles.

KNITTED PANTS and their Manufacture. 731,381. Henry H. Middleditch and Charles A. Gregory, Matlock Bath, England, assignors to John Smedley, Ltd., Matlock Bath, England.

STOCKING. 723,361. Lillian C. Calkins, Grand Rapids, Mich.

This invention relates to improvements in stockings for children's wear, and more particularly for boys in short pantaloons. Its objects are, first, to provide a stocking with which the back and front of the leg may be interchanged to avert as far as possible wearing them out too rapidly at

Fig. 1

Fig. 2.

the knees, and, second, to avert in like manner wearing out the feet and heels. These objects are attained by the construction illustrated in the accompanying drawings, in which—

Figure 1 is an elevation of the stocking as it comes from the machine, and Fig. 2 is the same as it appears upon the foot and leg of the wearer.

KNITTING MILL NEWS.

New Mills.

Georgia, Greensboro. E. R. Boswell, of Penfield, Ga., is reported as interested in a project which is on foot for establishing a new knitting mill at this place.

Maine, Portland. The Cambridge Knitting Mills

have been organized with a capital stock of $60,000 for manufacturing knit goods. E. W. Chapman of Boston, is president, and Charles A. Campbell, treasurer of the company.

*Massachusetts, Boston. The Boston Knitting Mills will start operations about July 15th, making ladies' and men's sweaters. They will operate 10 knitting and 12 sewing machines. Will sell direct. S. D. Cohen and H. Gordon are interested in the firm, which was previously reported to be started up by S. D. Cohen & Co.

*Massachusetts, Ware. Operations will start about July 1st by the Ware Hosiery Mill, L. P. Deslauriers, proprietor. Men's, ladies' and children's hosiery, gloves, mittens and sweaters will be made. Plant will be equipped with 10 knitting machines and operated by steam. A dye house will also be attached. Will sell product direct.

New York, Greenwich. The Linen Underwear Company has been organized with a capital stock of $50,000 by John P. Doane (Phenix Mills), Leroy Thompson, and James W. Wallace of Greenwich, and Mr. Sweet of Sweet & Doyle, (Cohoes, N. Y.,) to manufacture knitted linen underwear. They will erect a new building 80 x 36 feet, two stories for the purpose. Will use electricity for motive power.

New York, Hoosick Falls. Operations will soon be started by the Hoosick Valley Knitting Co., manufacturing balbriggan underwear. Matthew Trimble and George E. Trimble are interested in the company, which will equip the mill owned by Francis Riley. About 200 people will be employed at the start.

New York, Nichols. The Nichols Knitting Mill Company is a new company which proposes establishing a plant here, starting operations with about 50 people. Robert M. Baker, Milton Johnson and John R. Edsall are among the incorporators.

*North Carolina, Flat Rock. The Hart Knitting Mills Co. has been incorporated with a capital stock of $50,000 to operate the plant of the Hart Mfg. Co., recently reported in financial difficulties. The incorporators are P. W. Hart, F. G. Hart and P. H. Walker. It is not known just when the plant will be put in operation.

*North Carolina, Durham. Contract has been made for the erection of a new building to be built by the Durham Hosiery Mills, and in which they will install about 400 new knitting machines. The company has recently increased the capital stock to the above enlargement.

*Ohio, Leipsic. The Leipsic Hosiery Company has been incorporated with capital stock of $5,000. D. H. Lefiler is president of the company and H. F. Wendell, secretary and treasurer.

*Pennsylvania, Birdsboro. The Birdsboro Knitting Company will rebuild the plant destroyed by fire recently. Will equip same with 38 knitting machines and 4 sewing machines.

*Pennsylvania, Pennsburg. Samuel Woffindin is president and superintendent of the Pennsburg Knitting Company, which will start operations July 1st., making men's women's and children's cotton hosiery. Geo. W. Kite is treasurer and buyer of the company. They will operate 43 knitting machines, using steam power. Will sell product direct.

Pennsylvania, Philadelphia. The Somerset Hosiery Company, is the name under which Messrs. McCalley & Quern will operate a plant for the manufacture of ladies' fine cotton hosiery at 2420 Waterloo Street. The equipment consists of 22 knitting machines and 1 sewing machine. They have placed an order for another sewing machine which they expect to have on hand within a few days. Goods will be sold direct.

Pennsylvania, Reading. Labe & Brossman have purchased the machinery, etc., of the Duncannon Hosiery Mill and will remove same to 111 Lemon Street, where same will be put in operation. They will employ about 75 people.

Pennsylvania, Reynoldsville. An effort is being made for locating a knitting mill here, with capacity of 50 dozen pair of hose a day. $25,000 will be subscribed toward the project.

Wisconsin, Milwaukee. The Union Knitting Co., reported incorporated in a previous issue, will manufacture hosiery. This is the concern in which J. G. Pohler was mentioned as interested.

Enlargements and Improvements.

Georgia, Barnesville. The capital stock of Oxford Knitting Mills (owned by the J. C. Collier Co.) has been increased to $50,000. Improvements will be made in the plant, doubling the present equipment.

New York, Brooklyn. Samuel Regosin, manufacturer of knit goods, is installing one set 60-inch carding and spinning machinery, for purpose of making their own wool knitting yarns.

New York, Cohoes. An addition is to be built to the No. 1 mill of the Tivoli Mills, for the ribbing machines. Work will be started on construction in a short time and pushed to completion. Mill is operated until 9 o'clock evenings.

*North Carolina, Enfield. Work has begun on the installation of a dye plant in the Enfield Knitting Mills.

North Carolina, Newton. The Newton Hosiery Mills have been incorporated with capital stock of $10,000, by P. O., D. J. and P. W. Carpenter.

North Carolina, Weldon. Work has begun on an extension to the Weldon Cotton Manufacturing Company's mill. The present output of the plant 250 dozen per day, will be increased to 400 dozen per day after the addition has been completed. They manufacture mule spun cotton yarns and knit underwear.

*Pennsylvania, Avon. The capital stock of Lebanon Textile Co. has been increased $20,000 recently. They expect to have their new mill at East Lebanon in operation during August.

Pennsylvania, Norristown. Charles Gunn, of Philadelphia, has purchased the Franklin Knitting

Mills, operated by Roop & Baker. The capacity of the plant will be doubled.

Pennsylvania, Shamokin. A five story brick building will be built by W. F. Taubel, on land adjoining present mill. Contemplates having same in operation next spring.

South Carolina, Blacksburg. A meeting will be held June 30th by the stockholders of the Blacksburg Spinning & Knitting Mills, for increasing the capital stock from $25,000 to $100,000 or less, to issue $12,000 of preferred 8 per cent. stock, or to issue $12,000 of 6 per cent. bonds secured by a mortgage on the property. It is quite likely that they contemplate enlarging the plant, now equipped with 80 knitting machines.

Utah, Ogden. At meeting of the stockholders of the Utah Knitting Works, formerly the Ogden Knitting Works, Peter Anderson was elected president; M. F. Crowley, vice-president; and F. C. Parkinson, secretary and treasurer. The capital stock of the company is placed at $50,000. They are installing considerable new machinery, having now about 50 machines and expect to add from 10 to 15 more before close of the year. They manufacture underwear, hosiery and knit goods.

Mills Starting Up.

New Jersey, Camden. The Quaker City Knitting Mills at 9th and Market Streets, is the only manufacturing company of its kind in Camden. Mr. Bard, the manager, informed our representative that they were pretty busy for this time of the year but did not expect to be in full operation before the early fall.

*New York, Phoenix Mills. Fenimore Knitting Mills have been incorporated with a capital stock of $100,000, and have purchased and will operate the number 1 and 2 mills of the Index Knitting Mills. John P. Doane is president and general manager of the concern, and Richard I. Brewster, treasurer. They will make underwear and overshirts, starting operations July 8th with two sets cards, 77 knitting machines, and 199 sewing machines, use 6s to 40s, cotton carded and combed yarns. Goods will be sold through Bolger & Brewster, 256 Church St., New York.

*North Carolina, Henderson. The Seaboard Knitting Mills have been sold and will be put in operation sometime during July under new management. The plant is being enlarged and improvements made in the machinery equipment.

*Pennsylvania, Mohn's Store. The Electric Hosiery Co. is about to start operations, the new building having been completed.

Mills Shutting Down.

New York, Little Falls. Operations have been discontinued for an indefinite time in the Eagle Knitting Mills, Titus Sheard Co., proprietors.

*New York, Richfield Springs. The Waiontha Knitting Company is reported to remove its plant to Clayville. They were recently reported to make some extensive improvements to the plant, but will remove instead.

North Carolina, Kernersville. A petition in voluntary bankruptcy has been filed by R. B. Beard, manufacturer of hosiery.

PERSONALS.

Knit.

John Cantlin, formerly of Bristol, Conn., recently took charge of the carding department of the Plainville (Conn.) Mfg. Co.

John McNamara, formerly of Hudson, N. Y., and recently with the Plainville (Conn.) Mfg. Co., is now employed as overseer of carding by the Broadalbin Knitting Company, on flat knit wool underwear.

J. H. Akin has been appointed superintendent of the Riverside Knitting Mills, Cohoes, N. Y.

John Lambert has resigned as overseer of carding in Number 2 Mill of the Victor Knitting Mills Company, Cohoes, N. Y., and accepted a similar position in charge of carding for the Commercial Knitting Mills Co., Troy, N. Y.

James H. Aiken, Philmont, N. Y., has succeeded John Dunlap as superintendent of the Riverside Knitting Mills, Cohoes, N. Y.

Thomas Moran, formerly with the Broadalbin (N. Y.) Knitting Co., has been engaged by N. L. Birge & Sons, Bristol, Conn., as overseer of carding.

W. H. Willard, formerly secretary of the Tryon Hosiery Company, Lynn, N. C., on August 1st will assume the superintendency of the Shamrock Knitting Mills, Winston, N. C.

H. S. Lovern, superintendent of the Chickamauga Knitting Mills, Chattanooga, Tenn., has resigned, having accepted a position with the Sweetwater Hosiery Mills, Sweetwater, Tenn. O. M. Whitbeck will be his successor.

James Murphy, of Rockville, Conn., has been engaged as knitter by the United States Robe Co., Corunna, Mich.

George Raymond is the new boss carder for the Victor Knitting Co., Cohoes, N. Y.

R. M. Oates, of Hendersonville, N. C., has recently been appointed Southern representative for the E. Jenckes Mfg. Co., of Pawtucket, R. I., builders of the Invincible automatic knitting machinery, and will represent their interests in this section.

Robert Cochran, formerly of Norwich, Conn., is overseer of dyeing and bleaching at the Union Knitting Mills, Schuylkill Haven, Pa.

Frank Tubbs, overseer of finishing at the Little Falls (N. Y.) Knitting Mill, has resigned to accept a similar position at the Bailey Knitting Mills, Fort Plain, N. Y.

Alexander McCallum, formerly overseer of knitting at the mill of Titus Sheard Company, Little Falls, N. Y., is now with John K. Stewart at Amsterdam.

Pennsylvania, Rieglesville. The Durham Knitting Mill (L. S. Clymer, proprietor) has been closed indefinitely.

New Machinery and Processes.

This department is designed to present from month to month a brief mention of new machinery, devices, and processes being brought out in this country and abroad, that are of interest to textile manufacturers. It is not a list of patents, but of improvements coming on the market. The idea being to present to our readers a systematic monthly record of new machinery, etc., of interest to textile mill men.
We invite machine builders and others to send us such information for this department.

Interior Telephone System. The Stromberg-Carlson Telephone Manufacturing Co., Chicago, Ill., are placing on the market a new telephone for interior systems which is giving excellent satisfaction wherever installed.

Wool Bagging Machine. C. S. Dodge, Lowell, Mass., is putting on the market an improved wool bagging machine. It is automatic in action and so constructed as to press loose stock, such as wool, shoddy, noils and waste, very solidly into ordinary bags. The power can be regulated as desired up to a pressure that would burst the bag. It requires little attention and is sold at a moderate price.

Twister Stop Motion. The Draper Co., Hopedale, Mass., have adopted an improvement to their twister stop-motion, which consists in an extension of the rear portion of the signal so as to attract the eye of the operative when an end is broken. The idea was suggested by David Clark of the Ada Mfg. Co., and has been patented in his name.

New Hussong Dyeing Machine. The American Dyeing Machine Company, Camden, N. J., are placing on the market the new Hussong dyeing machine, which is described and illustrated in another part of this issue. Among the claims made for it are: durability, level shades, saving of time, dyestuff and labor, prevention of waste and open condition of dyed material.

Rotary Hydraulic Press. Messrs. Tomlinson, England, are introducing a new hydraulic press for cloth, the pressure being obtained by hydraulic means. This method of applying pressure by rotary press is not new. From a description of the Tomlinson press we judge that it has the merit of simplicity, the parts being readily accessible and apparently being as few in number as possible.

Warp Regulator. Gustav Thiele, Neugersdorf, Germany has brought out a device for regulating the tension and delivery of the warp of Turkish toweling and similar fabrics in which it is necessary for a part of the warp threads to be longer than others.

Rotary Fulling Mill. L. Ph. Hemmer, Aachen, Germany, has brought out an improved form of fulling mill in which several pairs of rollers are placed in line. The machine embodies several new features designed to overcome the difficulties which have been found in this kind of fulling mill.

Winding Frame. Pemberton & Co., Burnley, England, have recently begun the building of winding frames for winding on to warping bobbins. While the machine, as a matter of course, is constructed on the same general lines as the frames now in use, the builders claim for this new type solidity of construction, convenience of operation and freedom from danger to the operative.

Ring Spinning Machine. Elsassischen Maschinenbau-Gesellschaft, Mulhouse, Germany. A ring spinning machine whose distinctive feature is an inclination of the spindles inwardly so that the yarn passes in a straight line from the delivery rolls to the guide eye above the spindle. This arrangement enables the twist to pass without hindrance from the traveler along the whole length of the yarn to the delivery rolls. It is claimed that the yarn can be twisted as soft on this machine as on the mule. This machine is the result of many years of experiment on the part of the builders.

Smash Protector. Die Saechsische Machinenfabrik, Chemnitz, Germany. This is a movable reed, which is forced back from the cloth in case the shuttle is in the shed when the lay beats up. If the shuttle is not in the shed the reed becomes locked firmly in place before it strikes the cloth.

Strap-Fork Machine for Mules. Edwin Wilde of the Textile Spindle Works, Oldham, England, has invented and is placing on the market an attachment for mules by which stoppage of the spindles after the carriage finishes its inward run, is avoided. The spindles are run at reduced speed at this time. The attachment is in operation in several Oldham Mills and is said to be giving satisfaction.

Testing Device for Silk Yarn. Henry Baer, Zurich, Switzerland, is introducing an instrument for testing the strength and twist of silk yarn. While the general principles are the same as in all such devices, it is claimed for this that the construction and general arrangement gives a high degree of accuracy in making the tests.

Automatic Loom. Gregson & Monk, Preston, England, are placing on the market an automatic loom which has been tested with very favorable results. It is said to be very simple and not likely to get out of order. The automatic attachment adds but 13 pounds to the weight of the ordinary loom, and can be operated at a speed of 200 picks per minute. It is built on the self-shuttling plan.

Scotch Feed for Cards. T. Redshaw & Co., Hanging-Road Mill, Toad-Lane, Rochdale, Eng., are placing on the market an improved Scotch feed for cards. It is constructed on the same general principles as the ordinary Scotch feed, but has many minor improvements which experience has shown to be desirable.

Friction for Warp Beams. Huber, Mueller & Co., Zurich, Switzerland, have recently placed on the market, applied to their looms, an improved friction device. It is a rope friction and retains the advantages of that device without the necessity of using the numerous weights that are employed in the old style of rope friction. For the new friction the rope is passed around a pulley at one end of the loom. On the pulley shaft is a small sprocket wheel connected by a chain with a much larger wheel on the beam.

THE NEW HUSSONG DYEING MACHINE.

At Fig. 1 is shown a sectional view of the new Hussong dyeing machine for dyeing woolen and worsted slubbing and yarn in skeins, and built by the American Dyeing Machine Company, 609 Pearl St., Camden, N. J. Among the claims made for it is a rapid circulation of the liquor through the material without a disturbance and consequent matting of the skeins.

Fig. 1 shows the arrangement for controlling the circulation, by which the agitation of the liquor is outside of the partition; the yarn is suspended in liquor which is constantly being renewed without causing too strong currents to disturb the skeins. This feature of the machine enables floss yarns to be dyed without matting, and it is said that after dyeing the yarn has the appearance of having been reeled.

Another advantage of the machine is the construction by which a batch of yarn or slubbing can be moved from one dye tub to another without taking it from the machine itself, the latter being raised with the yarn and transferred as shown in Fig. 2, to any part of the dyehouse. In this way a large amount of time, labor, steam and dyestuff is saved. A batch can be scoured, washed and dyed without removal from the machine, which is transferred with the yarn from one tub to another. This feature is also of special advantage in using acid or alizarine dyes where treatment in different baths is necessary for a proper development of the shade. The third advantage of this dyeing machine is that the material is entirely submerged in the liquor while being treated. This prevents cooling of the bath and results in a saving of time and steam.

Great care has been taken in designing the machine to prevent the yarn from becoming tangled and wound round the dye sticks. The skeins are hung on a single stick which is three inches wide and one inch thick; this allows the yarn to turn freely. As there is no lower stick the machine can be very easily loaded and unloaded. Further particulars can be obtained upon application to the builders.

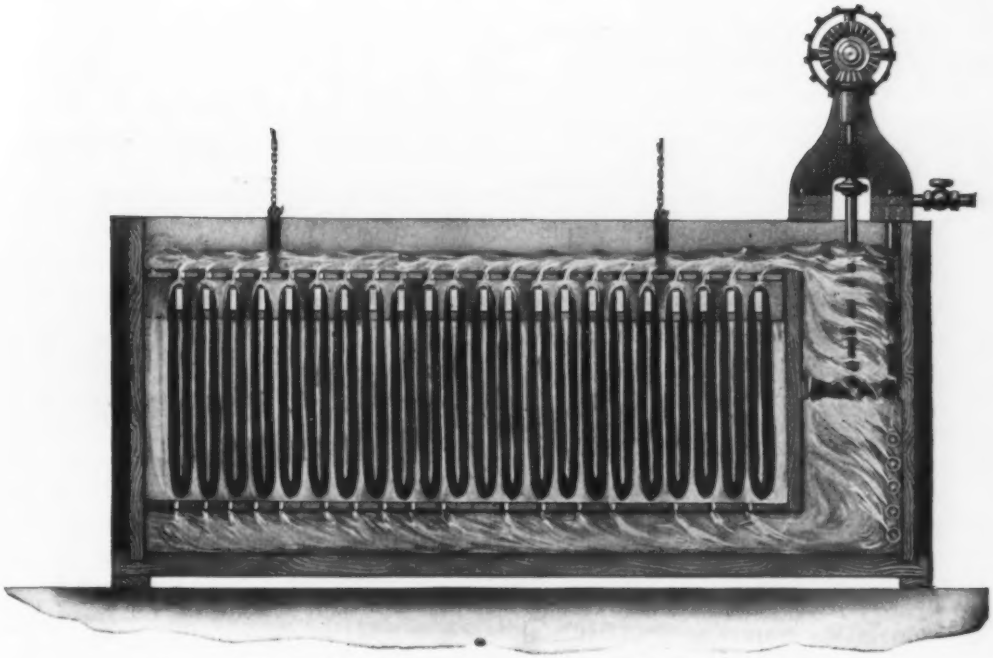


FIG. 1. SECTIONAL VIEW NEW HUSSONG DYEING MACHINE.

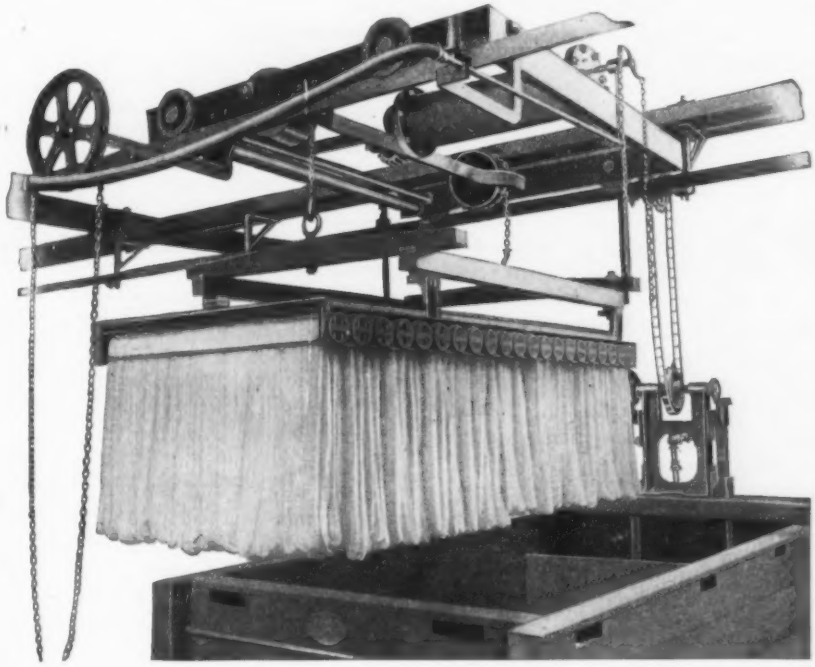
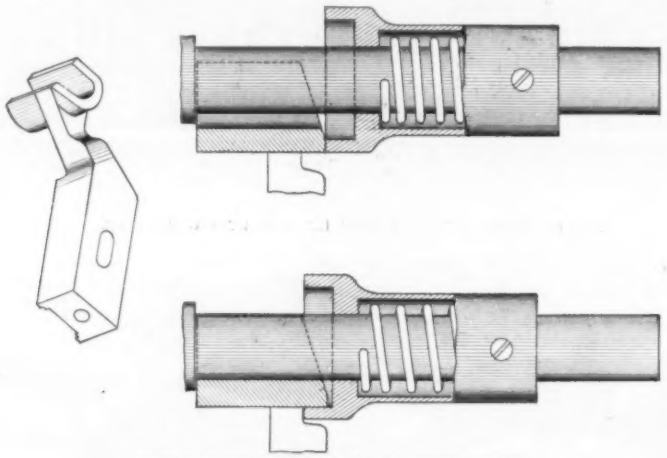


FIG. 2. NEW HUSSONG DYEING MACHINE.

NEW LOCKING DEVICE FOR STRIPPING BRUSH ON REVOLVING FLAT CARD.

This simple device is a patented invention of a practical carder. The purpose of the same is to prevent the stripping roll jumping and being forced out of its bearing and jamming or knocking down the wire of the cylinder or doffer. We are informed that the device is fully covered by patent and consists of a special loose bush and spring applied to the stripper brush, which bush can be moved lengthwise of the shaft. The stripper brush forced in position is automatically locked, but can instantly be moved by sliding the bush along the shaft. The advantages claimed are, that the automatic locking entirely prevents the jumping of the wire on cylinder and doffer by the stripper brush jumping out of its bearing. It effects the saving of stripping brushes as the same cannot be broken or damaged by getting out of bearing. It also effects time in stripping, as one man with this brush can practically accomplish the work of two. The stripper brushes will last considerably longer, as with this device they are thoroughly protected. On the ordinary brush the ends of the filleting are the first to give out, as these are usually damaged by the stripper roll jumping out of its bearing. With the application of this locking device the wire at the ends of the rolls will last as long as any portion of the brush.

The Howard & Bullough American Machine Company, Pawtucket, R. I., has acquired the sole right for the application of same to their revolving flat cards. Any further information will be furnished by them.



NEW LOCKING DEVICE FOR STRIPPING BRUSH.

AN AUTOMATIC TICKETING MACHINE.

The wire-stapling and binding machines shown on page 147 were introduced to the printing trade in the United States in 1895. They were well received and had a good sale. The device which prevents staples from obstructing the driving blade was added in 1897. This at once placed the machines in a class all their own and gave them the command not only of a wide but also of a sure market. Not only with the original users, that is the printing trade, but within the past two years they are becoming generally used by the upholsterers in binding their color samples, ticketing table covers, lace curtains, etc., instead of using the expensive brass fasteners and the provoking pin ticket which is forever catching and sticking into your fingers.

The Midget machine is designed for fastening light fabrics and is used largely by lace curtain manufacturers in ticket fastening, cloak and suit, straw braid and lace importing houses in mounting their samples on cards. It is also useful for desk use for fastening papers, and is largely used by lawyers, insurance and telephone companies for this purpose. It is automatic and holds 100 staples at a charge.

The Acme No. 1 binder, also automatic, is equipped with an anti-clogging device and

flat table, and carries 1/4 and 5/16 inch staples, blunt or pointed. This machine has lately been introduced to the textile trade throughout Pennsylvania and New York, and sprang at once into favor for getting out color cards, ticketing carpets, rugs, covers, etc. The pointed staple so readily removed and lying perfectly flat, was at once acknowledged as

THE ACME NO. 1.

THE SURE SHOT.

far superior to the brass fastener or pin ticket. This machine will bind up to about twenty colors of ordinary thickness. The hosiery people also appreciate this machine for its rapidity and the fact of the pointed staple leaving no perceptible hole in

THE MIDGET.

the garment when the ticket is removed. It holds 100 staples at a charge.

The Sure Shot was originally designed for heavy office work but its usefulness for the mill and factory was soon apparent, and it is now being used by a large number of carpet manufacturers for ticketing rugs, carpets, etc. This machine also has the anti-clogging device and will accommodate either blunt or pointed staples the same as Acme No. 1. The Sure Shot is more convenient and can be worked down a stack of rugs with great rapidity.

A strong indication of the merit of these machines is found in the fact that the manufacturers guarantee complete satisfaction with every machine and agree to make repairs free of charge. These machines are manufactured by the F. & G. Novelty Co., 467 Broadway, New York, who will supply further information to anyone interested.

THE HANDY STEAM TRAP.

In the practice of steam engineering, there is no problem more vexing in its solution than that of caring for the water in the distribution system. An automatic trap is the device most generally employed, and among the myriad of devices, offered, ranging from inadequate simplicity to complicated failure, there are many excellent traps, each having its advocates among intelligent users.

It is extremely doubtful, however, if any of them are infallible, and no doubt, all of them have been condemned at times, for often a trap that has given satisfaction and reasonable service at one plant, has been rejected at another, where the working conditions are apparently similar.

With all this knowledge in view, it is not to be wondered at that the extravagant claims of infallibility advanced for some particular trap is met with an incredulous smile from the practical engineer.

It is refreshing to find a manufacturer who is willing to admit that what they offer will ever need any repairs or attention, as the makers of the Handy trap will admit. At the same time they do not permit it to be inferred that their device is equaled or excelled in operation or durability by those offered by their competitors.

The trap, as shown in the accompanying drawings, has the familiar single seated, cone shaped, automatic valve, operated by a seamless ball float and bell crank, a type, probably, more universally used among successful traps than any other known.

The most novel feature of the device is the ease with which it is possible to get at the valve mechanism to examine or repair it when occasion demands. And the arrangement which secures this advantage, also simplifies other necessary functions in a trap. A discharge chamber is located in the head or cover, to which is attached all the working parts of the trap. The chamber has a bypass which connects to the body of the trap, to which all the pipes are attached. The interior of the trap is shut off from the chamber by a positive valve of the globe construc-

tion, provided with the ordinary stem and bonnet. The seat of this automatic is located in the positive valve, which has a cage extending beyond its inner end, and a hole is drilled in the stem to serve as a guide for the automatic valve, as well as locking it loosely in place, and preventing its becoming detached from the bell crank to which it is hooked.

The automatic valve is of the ordinary cone shape, having a hook at one end, and a brass stem at the other. These valves are

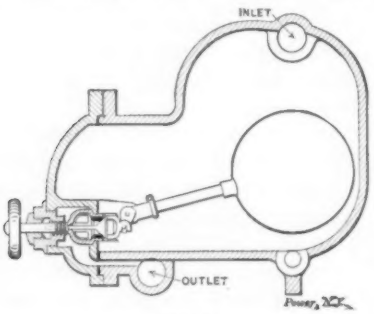


FIG. 1.

placed near the bottom, but far enough away to prevent scale or sediment from reaching them. They are also in a vertical plane, which renders it less liable to hold suspended matter and freer from leaking. By turning the hand wheel of the positive valve, it can be drawn away from the automatic valve, and permit the trap to drain or blow away any matter that may clog or interfere with the normal working of the trap. Should this prove ineffectual, the steam can be shut off, and the bonnet and positive valve removed; the automatic valve can then be unhooked from the crank pin, and withdrawn by the brass guide pin. This operation only requires the aid of a twelve-inch wrench and the finger, and can easily be accomplished in from two to five minutes' time.

The seat is a hard metal bushing, and the cone valve is made of the same material, to insure as long life as possible for these vital parts.

In the ordinary operation of the trap, there is a water seal of about three inches preventing waste of steam; a gauge glass on the side indicates at all times the working conditions of the valves.

Fig. 1 is a diagram showing the interior working parts of the trap. Figs. 2 and 3 are perspective views. To the practical engineer, an examination will enable him to judge the

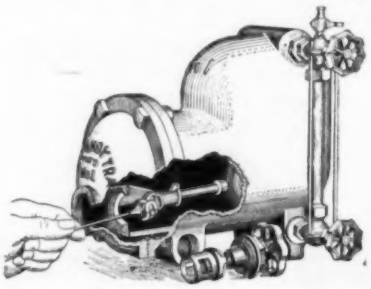


FIG. 2.

true value of the claims of the manufacturers of the trap, chief of which is, that the simplicity of the valve mechanism makes it so convenient to inspect or repair, that it is more likely to be done at once, thus preventing further waste.

As no bolts, gaskets, or pipe connections are disturbed to get at the valve seat and

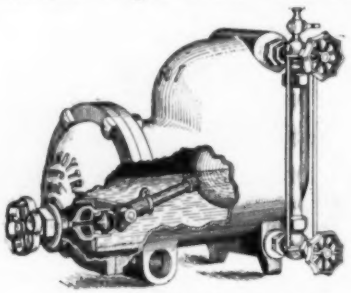


FIG. 3.

valve, the claim will be more readily believed that not more than five minutes are required to complete the operation. And as the valve and seat are generally the only parts requiring attention, it seems quite probable that it will receive more prompt attention, as it is a self-evident proposition, that the easier a task the more quickly it will be performed. And when this condition is compared with the hours of hard and disagreeable work, with its attendant expense, to repair many makes of traps, it is quite probable that the latter task will be deferred for an indefinite period of time, and permit the waste to go on. Further information concerning the Handy steam trap may be obtained from the manufacturer, E. M. Nichols, 639 Arch St., Philadelphia, Pa.

Dyeing, Bleaching, Printing, Etc.

MERCERIZING COTTON CLOTH AND ITS PRESENT DEFECTS.

The mercerization of cotton cloth has not yet been brought to that state of development attained in the mercerization of yarn in spite of the many ingeniously constructed machines for the continuous mercerization of cloth which have been brought out by leading machinery builders. In my opinion the effect produced by mercerizing the yarn can never be obtained by mercerizing the cloth. It is not sufficient merely to impregnate the maco, or similar cotton fibre, with a concentrated alkali solution and give it that transparent, gelatine-like appearance. There is no doubt that the silk-like lustre demands impregnation in a concentrated alkali solution and subjection to tension at the same time. It is well known that this lustre is still further heightened when the yarn is kept in tension until completely dry.

My belief that the lustre obtained by mercerizing the piece must always be inferior to that obtained by mercerizing the yarn is based upon the following views: It is unquestionable that the tension is greater upon the filling than upon the warp, while both are saturated equally with the alkali. The machine that will stretch warp and filling to the same degree has not yet been made. As the shrinkage of cloth is so great it is necessary to stretch it out well to preserve the width; as a consequence all the machines are constructed with an endless pin chain, as clamps will not hold the slippery goods. This results in the filling threads alone being stretched. If the warp is to be subjected to the same tension as the filling this must take place at the moment of saturation with the alkali solution in order to obtain the same effect as on the filling. This is never the case, however, and it follows that the mercerization of the filling is always more intense than that of the warp.

Another important reason why cloth can never be mercerized as well as yarn or warp is this: The yarn is well singed in the raw state and after this operation, which must be carefully performed, passes to the mercerizing proper, during which each individual thread is thoroughly impregnated with the alkali solution and at the same time subjected to the indispensable stretching. In all cloths, particularly close set fabrics, thorough singeing of each thread is out of the question because the heat or flame cannot reach that part of the threads where they are pressed closely together in the cloth no matter whether a gas or plate singer is used, consequently all places that are not reached by the singeing process retain a more or less fuzzy appearance which in the course of subsequent handling becomes very plain and injures the general effect of the dyed goods. After the goods have been thoroughly singed the subsequent processes necessary to finish them ready for the market cause a disarrangement of the position of the threads and bring in evidence the parts of the threads that were hidden and consequently not affected by the singeing process.

The lustre of mercerized goods is increased by calendering, but this calender effect is not permanent. A possible remedy for this difficulty may be found in singeing the warp and filling yarn and then mercerizing the cloth. This might make it possible to run the mercerizing machine much faster and thus give a greatly increased production by which the cost of the first mercerizing would be greatly reduced. I have repeatedly subjected goods to successive mercerizing processes and found there was no danger of injuring the material if proper care was taken.—Textil- und Farberei-Zeitung.

The material known as Dacca muslin was originally woven at Dacca, India. It was famous for its gossamer-like texture and has been known under the names of "evening dew" and "woven wind." It is still made by a few families in Bengal, so fine, that four months are required to weave one piece.

BLEACHING COTTON YARN.

BY CRESCENT.

No fixed rules and formulas will answer as a guide in the bleaching of cotton yarn. I have found that a chemic which will bleach a, say, 21's soft spun yarn snow white will have no effect on a 3/6 yarn; therefore a little judgment is required. In the first place the goods should be made up into five pound lots and skein run so they can be handled without difficulty. They are then put in the kier and boiled for six or seven hours in a solution of caustic soda and soda ash, then removed and washed thoroughly. The yarn should be put on sticks—about five pounds to a stick—then entered into chemic at 1 Tw., worked for four turns and then thrown out to drain; it is then aged on horses for three hours and washed off. Then enter the sulphuric acid bath; give two turns and then two washes and then soap and blue, extract and dry at 150 degrees. After drying the yarns will always work better if allowed to age off in a cool place for a day or two.

This is about the usual way of bleaching as it is done now. I had charge of a plant where we bleached 3,500 pounds daily with six men and one boy. I made a contract with the parties to provide labor and chemicals at one cent a pound, I to pay for all damaged goods. I was with them for one year and did not have any damaged goods. At the start their output was 1,500 pounds daily with six men and one boy. I raised the production until we were putting out 3,500 pounds daily without any extra labor and without any addition to the plant except a large kier. Previously the help had all they could do with 1,500 pounds.

I first made the yarn into five-pound heads if they were balled in the bale; if they were put into bundles in the bale I put them into the kier in the bundle, taking care to see that the bands were not too tight, pressing them in, as yarns put in dry will absorb and will go down in the liquor considerably. If the kier is a wooden one it should have a central vomit pipe. I would fill the kier with water and then add caustic soda and soda ash, boil seven or eight hours, then wash thoroughly and put on sticks ready for the kettle. I would have my chemic cold standing at 1 Tw. if for 21 soft spun or any fine counts, rising as the counts call for it; enter the yarns and give one turn and throw out on sticks to drain. I would let each batch age on horses for one hour, I would enter in a slight sulphuric acid bath, give one turn and wash off in three waters, extract and dry. I did not use soap on any knitting yarns, in fact, soaping yarn is a mistake. It does not make the yarn softer.

Care should be taken in handling the bales; they should not be dragged over the floor as this drags the dirt right through the burlap into the yarn, and dirt of that kind is hard to get out. They should be rolled if unhandy to reach with a truck. I mention this because this is the chief source of dirty yarns. I used soap at one time, but one day I was called into the knitting room where they were having a little trouble with their yarn. The yarn was good and strong, but there was a white dust getting into the machines and causing breakouts. I gave up using soap and the yarn was softer, there was more production from the machines and a clearer white. I have also noticed that where an oil softener is used and the yarn stored for any length of time, the goods become yellow. Some people claim this is due to the chemic. This last process is a very risky one for an inexperienced man, as care should be taken while the goods are in the acid bath as they are liable to tender if left too long. Goods bleached without soap will never turn yellow.

As to the streaking of yarns, that is something unusual; it is frequently seen in piece goods. It is a case of not boiling the goods sufficiently or may be the yarn has been boiled in a kettle on the sticks. If so that is where the trouble is. The cotton is not bleached through if not boiled through. A hot bleach attacks the fibre and gives it a harsh feel. Streaks are simply a case of inexperienced bleaching. It is often the bleacher that is at fault when the blame is put on the dyer for uneven shades, as some parts of the yarn are more thoroughly bleached than others. Where the parts are

bleached the most there will be the heaviest of the dye. The main trouble is an imperfect boil in the bleach house; that is the reason why silkoline is so difficult to dye light shades.

GARMENT DYEING, DRY CLEANING AND FINISHING

The equipment of an establishment to carry on the above business is a matter of no little concern, especially when one intends to fit out everything new that is actually required, and to make such additions as the natural increase of the business demands. Like every other business, it is not possible to give an exact catalogue of every article or appliance that could be used, but rather to enumerate those that are essential to a proper and satisfactory handling of the work.

The proper arrangement of the "plant" demands attention; the very first consideration should be given to light, ventilation and drainage. It seems almost incomprehensible that so many garment dyers seem contented to carry on their business in cellars and small dark rooms that are utterly unsuited for any such work.

The actual space set aside for dyeing should be ample in area, well lighted by high windows, and with preferably a cement or flagstone floor, so that at the end of the day's work it can be thoroughly flushed with water. It should preferably be on the ground floor, but it is often on the floor above—especially in small places. The water supply should be ample, not only for dyeing but for washing and rinsing. Steam for dyeing and drying should be obtained from a suitably sized steam boiler, and in making the purchase of such a necessity, obtain an upright, multitubular boiler, as being the simplest type to handle and manage. Of course, if it is possible to purchase steam from an adjoining factory or from a central steam plant, so much the better.

The dye kettles should be made of copper, and preferably spherical in shape. This form of kettle may be heated by means of a steam jacket or an interior closed coil of pipe. The common means of heating such kettles is by blowing the steam directly into the dye liquor. Although answering nearly all purposes such a method is somewhat wasteful, but it is, nevertheless, the one most popular with dyers.

The copper kettle should always be reserved for colors, on account of the ease of cleaning it. When black has been dyed in such a kettle, the thorough cleaning of it afterwards is somewhat difficult. For blacks, which form the majority of dyeings made on garments, it will be found best to instal one or two large wooden vats, one for union blacks for mixed goods, and the other for logwood blacks for woolen fabrics. These vats can be kept standing for months at a time if used continuously and properly replenished. They should be heated by open copper pipes.

Mechanical dyeing apparatus have not gained much favor with garment dyers, the reason being that their cost is somewhat prohibitive for many of the smaller jobbers, and also because they have not been constructed for this special branch of dyeing.

Special stripping kettles may be simply a medium-sized vat made of wood and heated by steam. Such a vat gradually becomes rotten, and as it need not cost much at the outset, it can be replaced once a year or oftener. Chrome and oxalic stripping is referred to.

Bleaching of white goods can very conveniently be handled in stone crocks of 10 to 50 gallon capacity, or one or more clean, heavy casks. Spirit barrels make a most satisfactory bleaching vat for either hydrogen or sodium peroxide, or for sulphurous acid.

In the same or an adjoining room should be arranged the draining pegs, of sufficient height so that the longest garment will not touch the floor, and so far apart that the garments may be reached without any trouble.

Some garment dyers prefer to drain, and in fact this is the only way of removing the excess of water from the garments, as wringing will, under no circumstances answer, but where power is at hand, steam or electric, a large whizzer should by all means be put in, as this is by all odds the most satisfactory method of removing excess moisture, as it leaves the garments in a better condition for finishing.

Drying, preparatory for finishing, is best

done in a dry room, which should be so situated that the condensation of the steam from the boiler will be as little as possible. A good practical arrangement is to provide a closet of sufficient size to accommodate the garments, etc., spread out by means of "hangers," and suspended from hooks. The floor of the room or closet being covered with a coil, in parallel, of 1 1/2-inch wrought iron pipe. This dry-room should be equipped with an exhaust fan at one end and several inlets for cold air, the ducts for which should lead it around the pipes in such a way as to supply a constant current of hot air.

The finishing machines proper consist of the calenders or ironing machines, which in small plants are the familiar ironing board and hand irons, and in more pretentious establishments consist of elaborate power machines. As a rule, much of the garment finishing consists only of "pressing," and for such, hand work is better suited.

One piece of apparatus that is absolutely necessary is the "steamer," being a copper perforated shell, into which steam is blown, and over which pile fabrics are laid while more or less tightly stretched, the object being to "raise the nap."

Many special articles, such as pieces of goods that are redyed for department stores, etc., are dried during the finishing process, and for this purpose the "drying table" is essential. It is simply a steam heated shell made of copper or iron, and over which the fabric is slowly drawn.

Regarding the equipment for cleaning but little can be said, except that clean washing tubs of proper size are required. Dry cleaning, however, demands special attention; it is based upon the great solvent action of benzine for all forms of grease, this power being materially augmented by the use of benzine soap, a special product soluble in benzine, and which is a most thorough cleansing agent for all forms of dirt and grease.

The appliances for operating this special process are few, consisting of suitable metal (galvanized iron) tanks for washing the goods, and a still, heated by steam, for the recovery of the benzine after being used. This is very important, and for operating in a most economical manner it will pay to install a proper apparatus in the beginning. On account of the inflammable nature of the substance used, all operations should be carried out in a separate building away from any possible source of fire, or on a roof. The cleansed garments, after having been washed in the final benzine, and squeezed, should be hung up to dry in the open air, which is accomplished in a short time. The finishing operations for such cleansed articles is exactly the same as for dyed goods.

Garment dyers are called upon to handle so many widely differing classes of goods that it is almost impossible to cover them all in an article of this kind, but it may be well to mention that rugs, skin mats, etc., should always be stretched by means of cords to frames, and kept stretched until finished. A well equipped place will have a number of these frames of various sizes.

The general arrangement of the whole establishment should be in order. The dye-house separate from all other departments, and the place for the dyes separated so as to be virtually a room by itself. This will be found to lessen materially the cost for dyes and drugs, which are frequently injured by being exposed to the steam of the dye house.

The dry-room can be located on the floor where the finishing is done, or convenient to this department. The cleaning and repairing should be entirely separate.

The removal of stains from garments, if done neatly, forms an important branch of the business, and as hardly any two stains are exactly alike, a small bench or table could be located in the finishing room on which could be placed the few chemicals necessary for this work. Few garment dyers have made a special study of stains, but those who have take delight in being able to remove them without recourse to severe treatment.

In the old days whole villages in Europe supported themselves by lace-making, and the patterns were handed down from one generation to another as valuable heirlooms. With the dying out of the families in which these patterns originated the finest designs have been lost, the few that are still in existence being preserved in museums and worth many times their weight in gold.

DIFFICULTIES IN THE DYEING OF NOILS AND RAW WOOL.

Noils, being the result of a mechanical operation, represent certain fibres that do not possess the full qualities of those which make up the entire mass from which they were removed. They are of considerable importance in the woolen industry and it is the object of the manufacturer to consume them whenever he can. To do this in a most satisfactory manner it is necessary to incorporate with them a certain proportion of good fibre, so that the resulting fabric will be homogeneous and the apparent shortcomings of the noils be completely hid by the good cloth forming qualities of the good stock added.

From a manufacturer's standpoint, this part of the process offers few difficulties, but the dyer is the one who has the most serious end of the proposition to contend with as he is looked upon to deliver level shades upon the stock sent to him. Almost every dyer who has had experience with this class of material knows that it is impossible to dye uniform shades upon it owing to the wide range of fibres in the mixture and, no doubt, coming from raw wools representing every quarter of the world.

All expedients that can be suggested have been tried; scouring under various conditions, dyeing at all temperatures; dyeing first neutral, then acidifying; mordanting at low temperatures, finishing at boil, and dyeing with various mordant colors; dyeing with various mixtures of acid colors, affixed at successive times in order to build up the shade, etc., and all without avail so far as producing a practical, one-bath method for mixed grades of wool.

Proper matching of shades upon this class of stock can only be obtained by dyeing before mixing, and certainly this will be found to be the most satisfactory method to follow as by this means irregularities in grading and scouring will be overcome and a much better piece of cloth result. Another point to be considered is the tendency of some wools to felt more easily than others and at widely different temperatures. It frequently happens that where there is a mere mixture of wools made without due regard to the felting propensity, the resulting dyed stock will be seriously injured for many purposes because, in order to dye a certain portion of the mixture, the whole batch required boiling for a time much beyond that actually necessary for the more readily felting portion. This is a point worthy of much more serious consideration on the part of mill owners and superintendents than is usually given it.

We believe, and feel sure that we are upheld by the majority of practical dyers, that the best way to produce the most uniform results is to dye the noils and wool in separate baths and do the mixing afterwards.

SCROOP ON MERCERIZED COTTON.

Boric (or boracic) acid is used for this purpose and meets the requirements admirably. The mercerized cotton is first bleached and then treated by passing through a bath containing from 10 to 15 pounds of the acid in the presence of a small quantity of some good soap. Sensitive colors, for instance, congo or benzopurpurine are not affected by this process, while the results secured compare favorably with silk.

Acetic and tartaric acids are also much used for this same purpose. The treated material is not rinsed but simply dried, and the better the drying the more permanent will be the result.

TREATMENT FOR IMPROPERLY SIZED WARPS.

A writer in Oesterreich Wollen und Leinen-Industrie gives a method of treating in the loom warps that have been insufficiently sized, which, he states, will correct all but the worst cases and prevent the necessity of taking the warp from the loom. A soft rope about an inch in diameter is stretched across the loom between the reed and harness so as to rest lightly on the warp. This rope is saturated with a solution of dextrin. During the movement of the rope backwards and forwards the warp absorbs more or less of the solution and is thus sized and made stronger. The sticky rope picks up the loose hairs, knots and flyings from the yarn, which is thus left much cleaner when passing through the reed.

TEXTILE PRINTING WITH METALLIC POWDERS.

Printing and painting with metallic powders date from a very remote period of artistic decoration, even its application to textiles is quite old as is shown by many beautiful specimens of tissues so embellished, but it is only in a recent period that the class of metal-decorated textiles has become popular. As a matter of fact, all woven fabrics are adapted to this kind of work, but the brightest and most pleasing effects are to be noted upon velvets and other allied goods.

Metallic powders adapted for this class of work are readily obtainable, being manufactured in large quantities of all degrees of fineness, and of a great variety of colors, from which many intermediate shades can be prepared, although the color mixer is seldom required to mix his metals to produce a given shade, as but two standard colors are being used—"silver" and "gold."

The principal work of the color mixer is to compound a "size" of such consistency as will print well, that is, will show a good impression, and to fix the metal permanently to the fabric, or at least fix it so that it will not readily detach even under a rather vigorous brushing.

Many formulas have been published, but the majority of them have been found wanting in some one quality, so that at the present time there are but few that can be said to possess technical merit. One of these processes is based upon the use of a coagulant—egg albumen—while the other is founded upon a base composed wholly or in part of India rubber.

The preparation of an albumen paste is simple; gum tragacanth of good quality is taken and soaked for 12 hours in cold water, when it is lightly boiled and strained. This gum does not actually dissolve, but swells to a remarkable degree in water, apparently taking up the water and holding it mechanically. A suitable quantity of egg albumen is likewise soaked in cold water until a smooth product is secured; heat must not be applied. When both pastes are ready they are mixed together with the proper quantity of metallic powder, then after thorough stirring the finished paste is ready for printing.

The practical working quantities of this type of paste would be as follows:

Tragacanth paste (65 to 1,000)..... 1 gallon
Egg albumen water (1 :1).....2½ gallons
Metallic powder.....15 pounds

This gives nearly 4 gallons of "color."

After printing, dry and steam at 212 deg. F., when the albumen coagulates and becomes insoluble, at the same time fixing the fine particles of metal so that they cannot subsequently be removed. The steaming and final drying should be the last operations to which the goods are subjected except, possibly, a brushing before final inspection and packing, all other operations being done before printing.

The rubber printing paste is of the nature of a varnish and requires, after being printed, to be aged and dried before further handling on account of the sticky nature of the paste. The following recipe yields a high class product and one similar to that used on the very highest class of manufactures.

Para rubber ..... 4 pounds
Camphor oil ..... 8 pounds

Thoroughly incorporate by heating over a fire in a large pan or kettle. When the rubber has dissolved remove from the fire and while still hot add with steady stirring:

Coal-tar naphtha, 2 quarts; followed by Copal varnish, 1 quart; stirring thoroughly and uniformly, afterwards covering and allow to become cold.

Gun cotton (or pyroxyline) varnishes are not adapted as adhesives for this class of decorative textile printing, especially for fabrics to be used for dress goods, but for other uses it is permissible, for instance, bookbinders' plushes, etc.

At all events the printing impression should be clear and sharp, and no doubt for general use the albumen paste will be found the most satisfactory, as it can easily be made to any consistency and be applied upon a cylinder machine. The other pastes are especially adapted for perrotine or block work.

New Color Cards.

Immedial Indone R Conc; Cassella Color Co., 182 Front St., New York City.

Five samples of yarn and four of piece goods dyed in the skein with Immedial Indone R Conc.

Direct and Reserve Print Effects; Cassella Color Co., 182 Front St., New York City.

Four samples of cotton piece goods showing direct and reserve print effects produced with Immedial Indone R Conc.

Rhoduline Sky Blue BB; Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.

Five samples of cotton piece goods dyed with Rhoduline Sky Blue BB.

Fashion Shades on Cotton Yarn; Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.

One hundred and twenty-six samples of cotton yarn showing a wide range of fashionable shades.

Azo Wool Violet 7 R; Cassella Color Co., 182 Front St., New York City.

Three samples of worsted yarn and three of cloth dyed different shades with Azo Wool Violet 7 R.

DYE RECIPES.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD RECORD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16-page pamphlet, in convenient form for preservation. Subscription price for the Dyers' Supplement $1.00 per year.

Recipe No. 97.

Red on Worsted Yarn.

Azo Red B B on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Azo Red B B.
(C. Bischoff & Co., 88 Park Place, New York City.)
15 lbs. Glauber's Salts.
4 lbs. Sulphuric Acid.

Enter at 170° F., bring to a boil and dye at a boiling temperature for one hour.

Azo Red B B produces an excellent shade of red with a bluish tone, which possesses the characteristic properties of the acid colors.

Recipe No. 98.

Blue on Cotton Yarn.

Direct Blue G G on 100 lbs. cotton yarn. Prepare the dye bath with

1 lb. Direct Blue G G.
(Bosson & Lane, Atlantic, Mass.)
10 lbs. Common Salt.

Enter yarn at 180° F., and dye at a boil for one hour.

Direct Blue G G possesses good coloring properties and will be found to be an excellent direct cotton blue.

Recipe No. 99.

Brown on Cotton Yarn.

Direct Brown N on 100 lbs. of cotton yarn. Prepare the dye bath with

2 lbs. Direct Brown N.
(C. Bischoff & Co., 88 Park Place, New York City.)
15 lbs. Common Salt.

Enter at 180° F., bring to a boil and dye at a boil for about one hour.

Then wash and develop in a bath of diazotized para nitraniline made up as follows:

6 oz. Para Nitraniline.
2 quarts boiling water.
1¼ lbs. Muriatic Acid.
4 gallons cold water.

Cool and add

3¼ oz. Sodium Nitrite,
1 lb. Sodium Acetate

and necessary amount of cold water.

Enter material cold and work cold for about one-half hour. Wash and dry.

Direct Brown N produces an excellent and fast shade of brown.

Recipe No. 100.

Black on Cotton Yarn.

Pluto Black C F Extra on 100 lbs. cotton yarn. Prepare the dye bath with

4 lbs. Pluto Black C F Extra.
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.)
40 lbs. Glauber's Salt.
2 lbs. Soda Ash.

Enter yarn at 180° F., bring to a boil, and dye at a boiling temperature for one hour.

Pluto Black C F Extra yields a fine bloomy black shade, and possesses excellent coloring power.

It is very useful in dyeing cotton and wool union goods.

Recipe No. 101.

Blue on Worsted Yarn.

Formyl Blue B on 100 lbs. worsted yarn. Prepare the dye bath with

2 lbs. Formyl Blue B.
(Cassella Color Co., 182 Front St., New York.)
10 lbs. Glauber's Salt.
3 lbs. Sulphuric Acid.

Enter the yarn at 100° to 120° F., bring slowly to

a boil and dye at a boil for 1¼ hours.

Formyl Blue B possesses excellent coloring power, purity of shade and the usual characteristics of acid colors.

Recipe No. 102.

Black on Worsted Yarn.

Benzyl Black 4 B on 100 lbs. worsted yarn. Prepare the dye bath with

7 lbs. Benzyl Black 4 B.
(A. Klipstein & Co., 122 Pearl St., New York City.)
10 lbs. Glauber's Salt.
3 to 5 lbs. Acetic Acid,

and if necessary to exhaust

½ to 1 lb. of Sulphuric Acid

toward the end of the dyeing.

It should be noted, however, that too much sulphuric acid will redden and dull the shade.

Benzyl Black 4 B is easily soluble, dyes level and gives a full bloomy shade, which possesses very good fastness to most of the color destroying agencies.

Recipe No. 103.

Blue on Cotton Yarn.

Metol Blue on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Metol Blue.
(L. B. Fortner, 36 Strawberry St., Philadelphia, Pa.)
20 lbs. Common Salt.

Enter at 170° F., bring to a boil and dye at a boiling temperature for one hour.

Metol Blue gives a very bright shade of blue, dyes evenly on cotton raw stock and piece goods as well as yarn. It is an excellent color for hosiery and knit goods.

Recipe No. 104.

Violet on Worsted Yarn.

Acid Violet (New) on 100 lbs. of worsted yarn. Prepare the dye bath with

3 lbs. Acid Violet (New).
(New York and Boston Dyewood Co., 156 William St., New York City.)
4 lbs. Sulphuric Acid.
20 lbs. Glauber's Salt.

Enter at 160° F., bring to a boil and dye at this temperature for one hour, exhausting the dye bath if possible.

Acid Violet (New) is not only valuable as an acid dyestuff, but is very useful in the dyeing of union goods, and possesses very level dyeing properties.

Recipe No. 105.

Black on Worsted Yarn.

Acid Black L D on 100 lbs. of worsted yarn. Prepare the dye bath with

8 lbs. Acid Black L D.
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.)
20 lbs. Glauber's Salt.
3 lbs. Sulphuric Acid.

Enter at 140° F., bring to a boil and dye at a boil for one hour.

In order to exhaust the bath better it is well to add another

2 lbs. Sulphuric Acid.

In dyeing goods containing cotton effects it is well to increase the sulphuric acid to 7 lbs.

Acid Black L D gives an excellent shade of black with a slightly bluish tone. It dyes easily, penetrates well and possesses excellent fastness to light. In dyeing cotton effects the cotton is not tinged.

Recipe No. 106.

Bright Green on Worsted Yarn.

Alizarine Green F on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Alizarine Green F.
(Berlin Aniline Works, 213 Water St., New York City.)
3 lbs. Meta Chrome Mordant.

Enter at 140° F., bring to a boil and dye at this temperature ½ hour, then add

3 lbs. Acetic Acid

and continue the boiling 1½ hours longer.

When dyed in this way Alizarine Green F gives a brilliant shade of green, possessing excellent fastness to light and milling.

Recipe No. 107.

Dark Red on Worsted Yarn.

Acid Magenta No. 1 on 100 lbs. of worsted yarn. Prepare the dye bath with

2 lbs. Acid Magenta No. 1.
(Read, Holliday & Sons, Ltd., 7 Platt St., New York.)
10 lbs. Glauber's Salt.
3 lbs. Sulphuric Acid.

Enter yarn at 170° F., bring to a boil and dye at a boil for about one hour, exhausting the dye bath if possible.

Acid Magenta No. 1 possesses a high coloring power and produces an excellent shade of bluish red.

Recipe No. 108.

Grey on Cotton Yarn.

Malta Grey J on 100 lbs. of cotton yarn. For the best results first mordant the yarn in a bath containing

4 lbs. of Tannin,

entering at 180° F., and allowing to steep 10 or 12 hours or over night in the gradually cooling bath.

Wring or hydro extract and without washing work for 20 minutes in a cold bath containing

4 lbs. Tartar Emetic.

Wash and then dye in a neutral bath containing

1 lb. Malta Grey J.
(Sykes & Street, 85 Water St., New York.)

Enter cold, work cold for 10 to 15 minutes, gradually bring to a boil, and dye at a boil for ½ hour.

Extra fastness may be secured by passing the dyed material first through a bath containing

5 lbs. Tannin

and then through one containing

5 lbs. Tartar Emetic.

Malta Grey J is remarkably fast to light and soap.

Recipe No. 109.

Navy Blue on Worsted Yarn.

Fast Navy Blue Extra on 100 lbs. of worsted yarn. Prepare the dye bath with

5 lbs. Fast Navy Blue Extra.
(H. S. Vila, 115 South Second St., Phila.)
10 lbs. Glauber's Salt.
2 lbs. Acetic Acid.

Enter yarn at 140° F., turn well, gradually raising the temperature to the boiling point. Dye at a boil for about one hour, lift, rinse and dry.

Fast Navy Blue Extra is extremely fast to sunlight, perspiration, fulling and salt water, produces level shades and is adapted to piece goods as well as yarn.

Recipe No. 110.

Chlorazol Heliotrope on Cotton Yarn.

Chlorazol Heliotrope on 100 lbs. bleached cotton yarn. Prepare the dye bath with

4 ozs. Chlorazol Heliotrope.
(Read, Holliday & Sons, Ltd., 7 Platt St., N. Y.)
20 lbs. Glauber's Salt.

Boil for 30 minutes, lift and wash.

Chlorazol Heliotrope produces a splendid heliotrope shade on cotton.

Recipe No. 111.

Brown on Worsted Yarn.

Acid Alizarine Brown B B on 100 lbs. worsted yarn. Prepare the dye bath with

4 lbs. Acid Alizarine Brown B B.
(H. A. Metz & Co., 122 Hudson St., New York City.)
10 lbs. Glauber's Salt.
3 lbs. Sulphuric Acid.

Enter yarn at 180° F., bring to a boil and dye at this temperature for one hour. Then add

3 lbs. Potassium Bichromate

and boil one hour longer.

Acid Alizarine Brown B B equalizes well, is as fast to rubbing as Alizarine Brown, and is excellently fast to alkalies, washing, milling and light.

Recipe No. 112.

Blue on Worsted Yarn.

Azo Blue No. 6,221 on 100 lbs. of worsted yarn. Prepare the dye bath with

3 lbs. Azo Blue No. 6,221.
(Sykes & Street, 85 Water St., New York City.)
15 lbs. Glauber's Salt.
4 lbs. Sulphuric Acid.

Enter at 140° F., bring to a boil and dye as usual for an acid color, exhausting the dye bath if possible.

Azo Blue No. 6,221 possesses excellent coloring power and produces a very desirable blue.

The Manufacture and Purification of Oils; by N. Chryssochoides; L. Mulo, 12 Rue Hautefeuille, Paris; 2 vols.; 444 pp.; price $2.50.

The manufacture of oils, both for food and industrial uses, has in recent years passed from the domain of empiricism to that of science. Previous to the appearance of this work there was no manual treating of the extraction, purification and testing of oils. It is divided into five parts: The first three united in one volume treat of the manufacture of oils in general. The last two forming the second volume relate to the purification of oils and the detection of the numerous impurities found in the commercial products.

It is impossible in the space allowed for this notice to give a detailed account of the compass of this manual, which includes all of the known oils. The text is in French.

Bleaching in the Open Width; by Dr. Friedrich Carl Theis; Friedrich Vieweg und Sohn; Braunschweig, Germany; price 50 cents.

A reprint of an article from the Textil und Faerberei-Zeitung, which is freely illustrated and treats of the latest developments in the art of bleaching cloth in the open width. The text is in German.

Mill News.

COTTON.

New Mills.

*Alabama, Livingston. Contracts have been let for the erection of the new building for the Livingston Mfg. Co., for making cotton filled goods. The main building will be 250 by 75 feet, two stories.

*Georgia, Cartersville. The main building of the new plant to be established here by E. L. McClain, of Greenfield, Ohio, will be brick, 300 by 125 feet. They will manufacture sheeting and drilling, to be used largely in manufacture of pads for horse collars.

Mississippi, Jackson. The Mississippi Textile Novelty Co. has been incorporated with a capital of $10,000 to manufacture fancy shirtings and leno goods. J. H. Price is president of the company, and S. R. Stevens, secretary and manager. A new building will be erected by the company.

*New York, Cohoes. Frederich Fleischmann is president of the Peerless Fibre Company, which succeeds the Carroll Manufacturing Co. They manufacture cotton bats and shoddy .

*New York, Gouveneur. Work is nearing completion on the new plant of the International Lace Co., which contemplates having about 700 people employed by September.

North Carolina, Bessemer City. A new company, known as the Whetstone Mills, has been formed with a capital stock of $45,000 to build a new mill for manufacturing cotton goods. S. J. Durham is president and L. W. Buck superintendent of the company. Work will start at once on the erection of the necessary buildings.

*North Carolina, Charlotte. E. A. Smith is president and treasurer of the Hoskins Cotton Mfg. Co. recently incorporated with a capital stock of $500,000. and site has been purchased for the erection of a mill, which is to have an equipment of about 15,000 spindles and 450 looms.

*North Carolina, Charlotte. The Mecklenburg Cotton Mills, recently incorporated with capital stock of $100,000, propose manufacturing coarse yarn from cotton waste, and expect to instal 16 sets. They contemplate having part or all of this machinery in operation by July 1st. William Coleman is president of the company and R. L. Tate, treasurer.

*North Carolina, Gibsonville. Work will start shortly on new mill to be built by the Minneola Mfg. Co.

*North Carolina, Lincolnton. The Wampum Cotton Mill has been incorporated with capital stock of $160,000. This is the new cotton mill in which J. A. Abernathy controls bulk of stock.

Pennsylvania, Philadelphia. Upham Bros. & Co. is the name of a new concern operating a plant at 38 So. Orianna St., on cotton threads. Office is at 240 Chestnut St.

Rhode Island, Woonsocket. Thomas and Robert Brindle have leased the lower floor of building formerly occupied by the Model Rubber Co., and will start operations about July 1st, making narrow tapes and fabrics.

*South Carolina, Greer Depot. Work is progressing on construction of the Alpalache Cotton Mills. The buildings are expected to be ready in about 60 days for installation of machinery, which will consist of about 17,000 ring spindles and 375 broad looms.

Enlargements and Improvements.

The American Net & Twine Company, Anniston, Ala., have adopted the American Moistening Company's system of humidification.

Alabama, Huntsville. An addition 60 by 138 feet will be built to the Lowe Manufacturing Co.'s mill. The Eastern Manufacturing Co. will also build an addition 60 by 120 feet. The present equipment of both mills will be increased. The capital stock of both mills has been increased to $200,000.

*Georgia, Lafayette. The Union Cotton Mills have awarded contracts for the erection of an addition to their mill. The machinery capacity of the plant will be greatly enlarged.

*Georgia, Pelham. A new dyeing and finishing plant, which will be installed in the Pelham Mfg. Co.'s mill, will have a capacity of 6,000 lbs. raw stock per day. A separate building will be built for the purpose, and it is expected to have same in operation August 1st. This company manufactures denims, operating 5,000 ring spindles, and 138 looms.

The Atlantic & Gulf Mills, Quitman, Ga., have (placed an order for humidifiers with the American Moistening Company, Boston, Mass.

Maine, Lewiston. A new water wheel to take place of a 500 H. P. engine, is being put in the Androscoggin Mill. They are also installing 200 (Northrop) looms.

Massachusetts, Lowell. An addition, 200 feet long, three stories and basement, will be built for the Appleton Company. The basement will be used for storage of cotton, the second floor for counting room in one end and other stories for beaming room. Work will start soon on construction.

*North Carolina, King's Mountain. The Enterprise Cotton Mills expect to have the new addition, reported to be built, in operation by September. They will install 2,500 spindles and 50 looms. Now operate 5,364 spindles and 180 looms on 27" sheetings.

*North Carolina, Lumberton. The Lumberton Cotton Mills, now operating 6,000 spindles, advise us that they will instal 5,000 more during the summer.

North Carolina, Saxapaw. An addition, 100 x 135 feet, two stories, is under construction for White, Williams & Co. They will install 100 additional looms in same and finishing plant.

Pennsylvania, Philadelphia. William G. Grange, manufacturer of upholstery goods with 24 looms at 9th and Dauphin Sts., has removed his factory to the new and up-to-date building of the Pfingst Hosiery Company, Kensington Ave. and Thayer Street.

Pennsylvania, Philadelphia. Owing to the fact of their being cramped for room the J. B. Mawson Hair Cloth Company, now at Coral and Dauphin Streets, expect to remove their plant in the near future to a building which they are having erected on Glenwood Avenue. They are now investigating the advisibility of using steam or electricity for motive power and expect to come to a conclusion in a very short time. They make hair cloths and imitations, also flannels, cotton and worsted dress goods, coat linings and duck linings, etc. Mr. John Mawson is the president of the company.

The Brogon Mills, Anderson, S. C., have placed an order for over 200 humidifiers with the American Moistening Company, Boston, Mass.

The Middleburg Cotton Mills, Batesburg, S. C., have adopted the American Moistening Company's system of humidification.

South Carolina, Blacksburg. At a meeting held recently by the stock holders of the Cherokee Falls Mfg. Co., the vote of the directors to increase the capital stock to $1,000,000 was ratified. They will instal 10,000 additional spindles in the present mill and erect a new building in which they will instal 40,000 spindles and about 1,500 looms.

*South Carolina, Clinton. The Lydia Cotton Mills expect to have their new addition, reported to be built, in operation by July 1st. They will install 7,000 spindles and 150 looms, which will give them a total of 12,000 spindles and 300 looms, making fine numbers in cloth.

*South Carolina, Graniteville. The Graniteville Manufacturing Co. proposes enlarging their mill and making additions to the present equipment, comprising 50,404 spindles and 1,674 looms.

*South Carolina, Hartsville. Work will start soon upon construction of new addition for the Hartsville Cotton Mills, previously reported to add more machinery to the plant.

*South Carolina, Pacolet. The Pacolet Cotton Mills, recently damaged by the flood, will be rebuilt. A meeting will be held July 14th, for purpose of increasing the capital stock of the company and erecting new plants replacing Mills No. 1 and 2, destroyed. Repairs etc. will be made to Mill No. 3, most of which was left standing, and operations will be resumed in that mill as soon as possible.

South Carolina, Yorkville. Contract has been let by the Tavora Cotton Mill Co. for additional machinery to be installed in the plant.

*Tennesse, Knoxville. Nearly all of the machinery has been installed in the new building for the Brookside Mills, and it is thought same will be ready for operations by July 1st. Fires have been started in the boilers for the purpose of testing the same.

Texas, Hillsboro. At the recent meeting of the directors of the Hillsboro Cotton Mills it was decided to increase the capacity of the plant by adding new machinery.

Texas, Sherman. A large addition is to be built to the Sherman Mill. They will instal additional machinery, greatly increasing the capacity of the plant.

Mills Shutting Down.

Alabama, Eufaula. The Eufaula Cotton Mills are to be closed until Sept. 1st. The machinery will be thoroughly overhauled. The shut down is on account of condition of the cotton market.

Georgia, Atlanta. The Atlanta Cotton Mills have been closed for an indefinite time.

Georgia, Macon. Operations have been discontinued indefinitely by the Manchester Mfg. Co. The cotton market is given as reason for shutting down.

*Massachusetts, Uxbridge. The Mumford River Tape Company reported in a recent issue as having made an assignment and after a short stoppage, had resumed operations, has been closed indefinitely. It is thought that the plant may be disposed of through the bankruptcy court.

New Hampshire, Claremont. The Mondanock Cotton Mills will shut down July 3rd, for one month. Operations will be continued though in the bleachery.

New York, Pleasant Valley. Garner & Co.'s mill has been closed for an indefinite time.

*Rhode Island, Bristol. The Namquit Mill, which recently resumed operations after a short idleness, has been obliged to close down again indefinitely.

Tennessee, Nashville. The Tennessee Manufacturing Co. will close the mill in a short time owing to the high price of raw cotton. Operations will not be resumed until September, when the new cotton crop comes in.

WOOLEN.

New Mills.

Connecticut, Bridgeport. The Owyhee Mills has been organized to manufacture woolens and worsteds, in the Salt's Manufacturing Co.'s plant. E. E Kip is president of the company and Charles F. Stead, treasurer, both occupying similar offices with the Salts Company. They will operate 100 looms. Goods will be sold through the department of G. Deichen, with W. Stursberg, Schell & Co.

*Maine, Corinna. Work is under way on the rebuilding of Charles A. Greenwood & Co.'s woolen mill.

Massachusetts, Worcester. The Percy Rug Co. has been incorporated with capital stock of $50,000, Matthew J. Whittall, president; Matthew Percival Whittall, treasurer. They will manufacture rugs, carpets, etc.

*New Jersey, Camden. John Lunn is president and manager of the Lunn Company recently reported organizing for scouring and carbonizing purposes; Alfred Lunn, vice-president, and Edward S. Lawrence, secretary and treasurer. They are now installing the necessary machinery, at Cramer Hill, a short distance from the city.

New Jersey, Camden. A new company under the name of Casey & Lund are about to start up in the business of spinning alapaca and worsted yarns on commission at 2nd and Erie Streets. The equipment of the plant will consist of 1 set worsted machinery and 960 spindles. Both members of the firm are experts in this business, Mr. Lund having been employed by William H. Grundy & Co., in their Bristol mill, for 19 years, and Mr. Casey occupying a position with Messrs. Erben, Harding & Co. for 14 years. The machinery is now being set up and will be in full operation the first week in July. The entire equipment of this plant has been supplied by Edward Jefferson & Bro., of Philadelphia, being new and of foreign manufacture.

*New York, Auburn. The American Axminster Co., whose new plant is under construction, expects to have same in operation by Fall, making Axminster rugs. This company is capitalized at $100,000, with A. F. Firth, president, G. H. Nye, treasurer, and Charles W. Read, superintendent. They will operate 20 looms, using steam power. A dye house will be attached to the plant.

*New York, West Eaton. It is expected that the West Eaton Woolen Mill will be completed by July 1st. Mill will be equipped with 5 sets cards and 25 looms. John H. Fraser will have charge of weaving and designing.

*Pennsylvania, Chester. The Powhattan Manufacturing Company has been organized to operate the No. 1 mill of the Esrey Manufacturing Co., making cotton and woolen goods. Cyrus M. Benson, Henry L. Trafford and Charles W. Andrew are interested.

Pennsylvania, Philadelphia. Mr. Thomas Graham is about to start up in the manufacture of ingrain carpets at 2420 Waterloo Street. One loom has already been set and five more, now on the ground, are expected to be ready for operation within a few days.

*Tennessee, Springfield. The new mill proposed at this place is to be a two set plant with 1,440 spindles and 20 broad looms. A separate building is to be built for the picker house. This refers to the Springfield Woolen Co., recently incorporated with capital stock of $50,000 by H. Tatum et al.

*Rhode Island, Wakefield. The Wakefield Manufacturing Co., recently incorporated with capital stock of $75,000 (authorized), expects to begin operations about September 1st. They will manufacture ladies' costume cloth and specialties, operating 4 sets cards and 24 looms. Louis F. Bell is president of the company; Geo. A. Kroener, Jr., treasurer, and F. B. Rollinson, superintendent. A dye house is attached to the mill. Goods will be sold through Ethan Allen, New York.

*West Virginia ,Keyser. The Patcheon Worsted Company has been incorporated with a capital stock of $100,000 by Jacob E. Patcheon, F. M. Reynolds, E. B. Reynolds, et al.

Enlargements and Improvements.

Connecticut, Vernon. Foundations are being laid for a new beaming room 40x90 feet, two story frontage, for the Vernon Mills Co. They have recently completed rebuilding of the dye house and installed a new dye tub.

*Maine, Newport. Work has begun on the foundations for the new additions to J. W. Weymouth & Co.'s wool pulling plant. The buildings will be 70 by 30 ft. and 42 by 30 ft., to be used mostly for storehouses.

Massachusetts, Boston. The Roxbury Carpet Co., operating mill at Roxbury, will build an addition to the plant.

Massachusetts, Charlton City. Work has begun on the erection of an addition to the picker mill owned by Akers & Taylor, manufacturers of woolen goods. The building will be 60 ft. long, and when completed the plant will be twice its present size.

Massachusetts, Holyoke. The Farr Alpaca Company will build a new engine and dynamo room, 55 by 75 feet, with steel truss roof, to their No. 2 mill. A new engine of 800 H. P. will be installed. Plans have also been drawn for an addition to the singe house, but it is not yet known whether this will be built now or not.

Massachusetts, Monson. Additional machinery, comprising a new set of cards, four looms, fulling mill and two mules, have been installed in D. W. Ellis & Son's mill.

Massachusetts, North Chelmsford. Six new looms and other machinery, including dyeing machinery, have recently been installed in the Shirreffs Worsted Company's mill. They have also placed orders for twelve more looms.

*Massachusetts, Plymouth. The dyehouse of the Puritan Mills previously reported in an insecure condition has been torn down and a new building will be erected. The dyeing is now done in one of the company's mills at Providence.

Massachusetts, Uxbridge. C. A. Root & Co. now operate 36 looms. They have also put in a new dresser and measuring machine.

Ohio, Hamilton. A two story addition, 79 by 179 feet, and a dye house 101 by 45 feet, one story, are to be built for Shuler & Benninghofen, manufacturers of woolen goods.

Oregon, Portland. The capital stock of the Portland Woolen Mills is to be increased to $175,000. General improvements will be made to the plant and capacity greatly increased.

Pennsylvania, Philadelphia. John Culbertson & Sons, 23d and Hamilton Sts., have purchased the machinery of the assigned estate of Simpson Bros.

Pennsylvania, Philadelphia. The plans have been finished and estimates are invited on a five story textile mill, 102 by 72 feet, to be built at Mascher Street and Glenwood Avenue, for Mr. Ferdinand Werner, manufacturer of ingrains. Mr. Emil Hartman is the architect, to whom bids must be sent.

The Rhode Island Worsted Company, Providence, R. I., have placed an order for humidifiers with the American Moistening Company.

KNIT.

For Knitting Mill News, see Knitting Department.

SILK.

New Mills.

New Jersey, Camden. The Florence Silk Manufacturing Company has been incorporated with capital stock of $50,000 by Thomas C. Mills, J. N. Landenburg and G. Josephs.

New Jersey, Paterson. The H. H. Seaton Company has been incorporated with capital stock of $30,000 by Hartley H. Seaton, Anthony B. Hopper and John K. Greenwood. They will operate a silk throwing plant in the Industry Mills.

New Jersey, Paterson. William R. Vanecek, William Schmidt and Charles A. Wilson have incorporated the Surety Silk Co. The capital stock is placed at $100,000.

New Jersey, Paterson. The Enterprise Silk Cmpany has been incorporated by John P. Hudson, Harry Stomely and Frederic Beh, with capital stock of $20,000, for purpose of silk throwing.

New York, New York. The E. H. Kluge Weaving Co. has been incorporated with a capital stock of $50,000. They will manufacture silk ribbons, labels, etc.

*Pennsylvania, Kutztown. The Berks Silk Company has been organized with capital stock of $25,000 to take over the Kutztown Silk Mill, recently reported sold to New York parties. Martha and Edward G. Landru and George Clair are the incorporators. Plant is equipped for silk throwing.

*Pennsylvania, Littlestown. Henry Musser, J. F. Kissinger and Sidney H. Souter are interested in the project of erection of a silk mill here, and will make application for a charter for the Littlestown Silk Company with capital stock of $50,000.

Enlargements and Improvements.

Connecticut, South Manchester. Contract has been awarded for the erection of a brick, one-story building, 58 by 60, as an addition to Cheney Bros. Dye House.

Connecticut, Willimantic. The Windham Silk Company has installed additional looms in the plant and now operate a total of 125.

Illinois, Chicago. The E. L. Mansure Co., trimmings and embroideries, Lake St. and Michigan Ave., which bought a portion of the Saranac Mills, Philadelphia, two months ago, will also begin enlargement of their Chicago plant at once. Two stories with twenty-two thousand square feet will be added. Improvements are also under way at the Philadelphia plant.

*Pennsylvania, East Stroudsburg. W. Burnet Easton is president of the Wm. A. Gillbert Co., capitalized at $50,000, and operating the Bliss Silk Mills. Wm. A. Gilbert is treasurer and superintendent. They operate 24,000 spindles, throwing tram and organzine on commission. A new fireproof vault, 20x45 feet will be built.

Pennsylvania, Hazelton. The Dunlap Silk Mill Co., operating a leased plant at Bethlehem, is reported to remove same here, when lease expires. They have started installing some looms in building on East Diamond Avenue.

Pennsylvania, York. The York Silk Manufacturing Company has increased the capital stock from $1,800,000 to $5,000,000, for purpose of making large extensions to the plant. An effort is being made for securing control of the Monarch plant.

Rhode Island, Alton. The mill site and privilege formerly occupied by the Wood River Mills, burned some years ago, have been sold to a new company, to be known as the American Mercerizing Co., who will remodel some of the remaining buildings and probably erect new. They will equip the plant for mercerizing, dyeing and bleaching. Thomas Frusher of the dyestuff firm of Frusher & Co., Providence and New York, will be at the head of the enterprise.

Mills Starting Up.

*Connecticut, Norwalk. Operations have been started in Joseph Loth & Co.'s silk mill; 52 looms are now running.

MISCELLANEOUS.

New Mills.

New York, Buffalo. The Ryder Belt and Cordage Co., capitalized at $200,000, will establish a plant here for manufacturing belting and cordage of all kinds. It is expected that the new plant will be in operation about the middle of August. George A. Cole, A. C. Goodyear and others are interested.

Enlargements and Improvements.

Connecticut, Sterling. A new drying system for use in connection with tentering machines is being installed by the American Blower Co. in the plant of the Sterling Dyeing & Finishing Company.

New Jersey, Rahway. The Howard Dyeing & Finishing Co. has been incorporated with capital stock of $50,000, to operate the plant formerly controlled by Howard & Co. The incorporators are: Henry Morris, Geo. Morris and Henry and James M. Howard, of Rahway.

Pennsylvania, East Allentown. A new system of heating and ventilating is being installed in the dye works of Lotte Bros., furnished by the American Blower Co.

Pennsylvania, Philadelphia. The Providence Mills Manufacturing Co., 55th Street and Girard Avenue, West Philadelphia, will add another story to its building at once. The contract has been given out and work will commence immediately. This company has a capital of $100,000, with Mr. Benjamin Bell, president; and bleaches damasks and crashes.

FIRES.

Pennsylvania, Dowington. The picker house buildings of the Rockstone Woolen Mills have been destroyed by fire, causing loss of about $10,-

000. Buildings will be rebuilt and new machinery installed.

Rhode Island, Harrisville. Wm. Tinkham's Woolen Mills were damaged by fire recently. The loss on building and stock is estimated at about $3,000, covered by blanket insurance policy. Fire started in building used as office and stock room. The main building was not touched.

FAILURES AND SUSPENSIONS.

New York, New York. The Manhattan Knitting Co., 256 Church St., manufacturers and dealers in knit goods, hosiery, etc., has assigned for the benefit of its creditors, to Isaac Josephson. Simon Hirschberg is president of the company.

Rhode Island, Chepachet. An assignment has been made by the Glocester Worsted Mill, Abraham Mellor proprietor, to Wm. H. Prendergast, who will continue operating the mill.

FACTS AND GOSSIP.

Alabama, Ozark. S. J. Goff is reported as interested in establishing a mill for manufacturing cotton rope, twine, mattresses, etc.

Connecticut, Oakdale. The Massasoit Manufacturing Co. is removing the machinery from the mill to the main plant at Fall River, Massachusetts. The Oakdale building is owned by Palmer Bros., who are reported to use it in connection with their other mills.

Georgia, Augusta. The Clearwater Bleachery is operated night and day owing to large number of orders.

*Georgia, Eatonton. We have been advised that the sale of the Quintette Cotton Mills and the Eatonton Electric Mills was not confirmed by the referee in bankruptcy. The Property will be resold at some future date, not yet set.

Maine, Readfield. It is reported that the Nawoc Woolen Company will be re-organized and the property put in condition for use or sale.

*Massachusetts, Fall River. At a meeting held recently by the stockholders of the Luther Manufacturing Company it was voted to accept the proposition of the board of directors, that the property of the Robeson Mills be purchased. Property will probably be transferred to the new company within the next month. It was also voted to issue bonds for $250,000 with interest at five per cent. The money received from the bond issue is to be used for erection of a new weave shed and entirely renovating the old Robeson plant.

Massachusetts, Methuen. Charles Collins, James Wolger and S. Foss are reported installing looms in the old dye house here.

*Massachusetts, Millis. The plant of the National Flax Fibre Mills is to be dismantled.

Massachusetts, New Bedford. The Whitman Mills are reported as interested in the erection of a new plant on nearby property. A company is to be formed with a capital stock of $1,000,000, and the management will be practically the same as that of the Whitman Mills. Spinning and weaving machinery will be put in.

Massachusetts, Rockland. H. J. Kennedy, proprietor of the Rockland Braid Works has disposed of the business.

*North Carolina, Laurel Bluff. The Steele Bros. Co., recently reported incorporated with capital stock of $20,000, purchased plant of the Laurel Bluff Cotton Mills, A. J. Thompson, proprietor, and will continue running same. The mill is equipped with 2,500 spindles for making cotton yarns and warps, 14s and 16s.

North Carolina, Spray. The Rhode Island Co., has been incorporated with capital stock of $125,000. A plant of 10,000 spindles, is proposed.

Pennsylvania, Chester. The mill of the Standard Manufacturing Company has undergone a process of transformation. The old machinery has been dispensed with and new slubbing and intermediate machinery and a set of combers have been put in, enough to comb the entire production of the mill, the machinery being from John Hetherington & Sons, England, S. C. Lowe, Boston, Mass., American Agent. This mill works exclusively on cotton yarns and are very busy. Mr. T. W. Trainer is the superintendent.

*Pennsylvania, Glen Riddle. The Penn Tapestry Company has been re-organized. Joseph S. MacElroy, president of the company when first incorporated, has sold his interest to the remaining stockholders. H. S. Griffith, the treasurer, will continue operating the mill. The plant has been closed pending re-organization, but will be started up shortly.

Mississippi, Sardis. D. L. Rush is reported as interested in organizing a company with capital stock of $100,000 and is getting prices on machinery, equipment, etc.

Mississippi, Tupelo. It is reported that representatives of a stock company in Missouri have been investigating properties here relative to establishing a cotton mill with about 10,000 spindles.

Missouri, Carthage. A 10,00 spindle mill is reported to be established here. Capital stock of company proposed is $250,000. Witten McDonald is interested in the project.

Missouri, Colecamp. Albert Schwed, T. C. Newby and others have incorporated the Colecamp Woolen Company with capital stock of $50,000.

New Brunswick, Golden Grove. The New Brunswick Woolen Mills Co. is to be incorporated with a capital stock of $15,000 to operate the plant of Alex Willis & Sons. H. N. Sharpe and S. A. Kimball are among the directors of the new company.

New Hampshire, Dover. The Cocheco Manufacturing Co. is reported to curtail production and the entire plant, including print works, will be closed in August for a week or longer.

New Jersey, Camden. Messrs. Shapcott & Weaver, 2nd and Erie Streets, manufacturers of carrying cloths report that they have all the business on hand that they can handle, having lately added to their production the manufacture of cotton towellings and bagging.

New Jersey, Camden. The Philadelphia Worsted Company at 76 Erie Street, Camden, N. J., have increased their capital from $10,000 to $125,000, Mr. Charles W. Thompson is the president and agent. They are running full time on fine worsted yarns which they manufacture in the English system. This company was formerly located at 74 and 78 Elm Street in the same city.

New Jersey, Camden. The Camden Wool Stock Company, 2nd Street and Delaware River, recently incorporated, is not yet in full operation. They are very busy but expect, by the 1st of July, to be running to their full capacity. This company carbonizes and manufactures wool stock. Mr. Thomas E. Lee is the manager.

*New York, Oswego. W. H. Stansfield is president of the Ontario Knitting Company, recently reported incorporated; Chas. A. Byington, vice-president; Geo. A. Frisbie, treasurer, and Geo. E. Farrell, secretary. The above company also controls the Kendall Knitting Company and the Regal Textile Co. The Regal Co.'s plant is reported to be removed to the Kendall mill at East Utica.

New York, Utica. The controlling interest in the Globe Woolen Mill has been purchased by John F. Maynard, Frederick T. Proctor and Joseph Rudd. Walter D. Middleton, president of the company, will be on the board of directors under new management. It is reported that a new mill, four stories, brick, may be built for the worsted yarn department.

North Carolina, Charlotte. It was decided at a recent meeting held by the stockholders of the Ada Mill that the plant go into voluntary liquidation. The liabilities of the company are placed at about $60,000 secured by personal notes of the directors, and the assets are reported as large enough to cover the indebtedness. This plant is equipped with 8,000 ring spindles. George A. Howell is president of the company and David Clark treasurer.

*North Carolina, Charlotte. The Victor Cotton Mills which have recently been put in the hands of a receiver, (A. E. Hutchinson) will not be reorganized as has been contemplated. The plant will be sold at auction or private sale. The liabilities of the company are estimated at about $86,000.

Pennsylvania, East Stroudsburg. Wm. A. Gilbert has purchased the Bliss Silk Mills.

Pennsylvania, Meadville. The Meadville Silk Mfg. Co., manufacturing taffetas and peau de soies, reports business rushing as usual. David Isaac is superintendent of the mill.

Pennsylvania, Philadelphia. Murphy & Bros., manufacturers of woolen goods, are reported as contemplating the purchase of a plant in the South for manufacturing white and colored goods.

Pennsylvania, Philadelphia. Application has been made for a charter for the Angola Dyeing Co. by Gustave Rumpf, Fred Rumpf, T. E. & Henry Brown et al.

Pennsylvania, Philadelphia. Sibson & Stern will make application for a charter for purpose of manufacturing knit and woven goods.

Pennsylvania, Philadelphia. Mr. James McKechnie, manufacturer of school bags, hammocks and textile novelties, in the Davenport Mill, 2350 Mascher Street, has sold out his business to Joseph Gillespie, who will continue to make the same class of goods, using six looms in his operations.

*Pennsylvania, Upland. Joseph Walworth has purchased the Upland mill proper of J. Walworth & Sons, recently reported to be sold.

*Rhode Island, Centreville. The Treat Cotton Mill, property of Robert Treat, who recently made an assignment, has been sold to Robert Knight, who will operate the plant.

Rhode Island, North Providence. Dexter, Lambert & Co., operating silk mills at Paterson (N. J.) and Hawley (Pa.), have purchased the mill and other real estate of the Allendale Company. They will equip same for silk manufacturing, and have been exempted from taxation for ten years.

*Rhode Island, Woonsocket. The National Pile Fabric Co. advise us that there is no truth in the report that their plant is to be removed from this place. They will continue manufacturing in Woonsocket, and are now operating 100 looms on corduroys, and contemplate adding 60 more looms. The entire productions are sold through the New York office.

Rhode Island, Woonsocket. The Perseverance Worsted Company, operated by Ralph P. Singleton (England) and James H. and J. Ernest Singleton, co-partners, has been dissolved. The business will hereafter be carried on by James H. and J. Ernest Singleton.

South Carolina, Blackville. A hosiery finishing mill is being built here by a Mr. Green. It is reported that same will be running in a few weeks time.

South Carolina, Pacolet. The Pacolet Mills were greatly damaged by the recent floods. At Mill No. 3, one-half the picker house was washed away, and five stories on the left side of the long building. The boiler room is also gone. Machinery in the mill is ruined.

Tennessee, Humbolt. H. C. Burnett and others are reported as interested in establishing another cotton mill here. No definite action has yet been taken in the matter.

Texas, Corsicana. The T. M. Stroud Cotton & Woolen Mills Co. has been incorporated with capital stock of $25,000 for manufacturing purposes. T. M. Stroud and W. B. Barnes are interested.

*Texas, Marble Falls. M. H. Reed and associates are reported as interested in organizing a company for manufacturing textile goods.

Personals.

Cotton.

Frank Witham will succeed the late Archie V. Maxwell as overseer in the weaving department of the Laconia Mills, Biddeford, Me.

A. Morang will succeed Capt. N. W. Cole, as agent of the Edwards Mfg. Co.'s mill, Augusta, Me. Mr. Morang recently became superintendent through the death of Milton M. Stone, and now through the death of Capt. Cole, succeeds to the agency.

James Prim, formerly of Concord, N. C., is now in charge of weaving at the Cornelius, N. C., Cotton Mill.

Thomas Madden, overseer of mule spinning in the Richard Borden Mill, Fall River, Mass., has resigned.

Walter W. Coe has resigned as overseer of the Berkshire Co.'s mill, Adams, Mass., and will retire from active work. He will go to Methuen, where his family resides, and where he has real estate interests.

B. F. Barnes has resigned as superintendent of the mills of the Whaley Company, Columbia, S. C.

John R. Butterworth, formerly superintendent of the American Print Works, has been appointed manager of the Clyde Print Works at River Point, R. I., to succeed Robert Reoch, who has served 33 years and who now retires.

H. E. Brann, overseer of carding at the Hamilton Web Co., Hamilton, R. I., has resigned.

Henry S. Fenner has resigner as treasurer of the Ancona Company, formerly Slade Mills, Fall River, Mass., and will take a needed rest in a vacation.

W. Kinsley, for several years in charge of the weaving department of the Blackstone Company's mill at Occum, Conn., left there recently to take a similar position at White Rock, R. I.

Thomas Madden has been appointed overseer of the mule and ring spinning for the Wampanoag Mills, Fall River, Mass., succeeding Patrick Hanrahan and J. C. Blanchette, who had charge of the respective departments for a number of years.

J. V. Miller, overseer of spinning for the Stafford Spinning Co., Fall River, Mass., has resigned.

J. C. Mathis has accepted the position of managing superintendent of the Cooloomee, N. C., Mills.

Hugh McD. Laird, who for fifteen years has been an overseer of the finishing department of the Parkhill Mill C, has closed his connection with that concern to become associated with the Hampton Co., of Easthampton, Mass.

Dennis McGraw, superintendent of the Exeter Manufacturing Co., Exeter, N. H., has resigned. His successor will be Chester D. Hatch, of the Amory Mills, Manchester.

Ernest Paget has been appointed overseer of the cloth room for the Hargraves Mills, Fall River, Mass.

Frank Ritchie, an overseer of weaving at the Central Mills Company, Southbridge, Mass., where he has been employed for 23 years, has resigned.

Walter S. Taylor, formerly designer at the Parkhill Mfg. Co., has been appointed assistant superintendent of the Arlington Mills, Lawrence, Mass.

C. L. Wyckoff, formerly of Concord, N. C., has succeeded S. D. Enbanks as overseer of weaving at the Statesville Cotton Mill, Statesville, N. C.

James F. White has resigned as overseer of spinning room at Peck Mill, Pittsfield, Mass. Mr. White has been employed by the Peck Mfg. Co. in this capacity for upwards of 14 years. He is succeeded by Henry Bussier, who has been assistant overseer.

J. Wentz has become overseer of carding and spinning of Mill No. 3 of the Cannon Cotton Mfg. Co., Concord, N. C. He succeeded E. A. Holt, resigned.

B. F. Teague has been appointed superintendent of the Bennettsville Cotton Mill, Bennettsville, S. C. He was recently with the Elmore, S. C., Springfield Mill.

Samuel Sharp has succeeded his father, Mark Sharp, as overseer of dyeing at the Hamilton Woolen Co., Globe Village, Mass.

Sumter Moore has been appointed purchasing agent for the mills in the Whaley syndicate at Columbia, viz., the Orient, Richland and the Granby.

John Mott, bleacher at the Aspinook Co., Jewett City, Conn., has resigned.

Peter McKee, formerly of Norwich, Conn., has taken charge of the bleaching in the Chautauqua Towel Mills, Jamestown, N. Y.

Woolen.

George Patterson, formerly overseer of the spinning room at the Kennebec Worsted Mills at Fairfield, Me., has gone to Gilbertville, Mass., where he has entered the employ of the Gilbert Mfg. Co.

Peter Ferguson, Manayunk, Philadelphia, is now employed as overseer of carding by the Oakland (Me.) Woolen Company.

Joseph Lee, of Lawrence, Mass., has recently been engaged by the Muskegon Valley Woolen Mfg. Co., Dresden, O., as dyer.

George Walker has been engaged as carder by the Manningham Worsted Mills, Germantown, Pa.

A. B. Taylor is the new designer at the Calumet Mill, Uxbridge, Mass.

F. B. Mowry is the new carder at the Royal Mill, Uxbridge, Mass. He was formerly in Oxford, Mass.

August Kuhnert is the new dyer at the Riverview Worsted Mills, Waterville, Me., succeeding Archibald Ormiston, who has gone to England.

P. J. Carey, Blackinton, Mass., is finisher at the Assawaga Co., Dayville, Conn., succeeding Thomas Welch.

Ulick Burke, of Saxonville, Mass., has been engaged as dyer by the Black River Woolen Co., Ludlow, Vt.

F. K. Allen, agent of the Megunticook Woolen Co., Camden, Me., has resigned.

H. W. Howe, of Worcester, Mass., succeeds the late Andrew Pinney as superintendent of the Palmer Carpet Co., Palmer, Mass.

Frank Hitchcock, formerly of Ray Woolen Mill, Franklin, Mass., is now at Dresden, O., as overseer of carding in the Muskingum Valley Woolen Mfg. Co.'s mill.

Walter Knott, boss weaver at the Lakeside Worsted Mill, East Madison, Me., has resigned.

Albert Otto, master mechanic, Broad Brook, Conn., Company, woolen, has severed his connection with that concern, and is now at Glen Falls, N. Y.

J. H. Powers, of Saem, N. H., has been engaged as boss carder by Weise & Nichols, North Oxford, Mass.

William H. Wilcox, formerly superintendent at the Somerville Woolen Co's. shoddy plant, Pluckamin, N. J. has resigned and returned to his home at Madison, Me.

Richard Thompson, formerly dyer at the Sulloway Mills, Franklin Falls, N. H., has secured a position at Lowell, Mass., as dyer.

William Stuart, finisher at the Elmville Woolen Co., Danielson, Conn., has resigned.

David Pendergast, Jr., has recently succeeded D. Pendergast as superintendent of the Gloversville Felt Co., Gloversville, N. Y. The latter has accepted a similar position with the Consolidated Felt Co., Amsterdam, N. Y.

Alfred Otto, who recently resigned as master mechanic at the Broad Brook Co., is now with the American Felt Co., Glenville, Conn.

Mr. Mueller from the Germania Mills, Holyoke, Mass., succeeded David Welsh as finisher at Saxonville, Mass.

James, Mullin, formerly dyer at Hinsdale, N. H., is the new dyer at the Charles River Woolen Co., North Bellingham, Mass.

Morris Gledhill, formerly superintendent of Knoxville, Tenn., has succeeded M. Glennon as superintendent of the Oakland Mfg. Co., Baltimore, Md.

Kemp Alexander, formerly connected with the Windemere Knitting Mills of Albemarle, N. C., is the new superintendent of the Davis-Crews Knitting Mills at Kernersville, N. C.

John T. Jordan, formerly of Orangeburg, S. C., has taken charge of the Richmond Cotton Mill, Laurel Hill, N. C.

George Barr has assumed his new duties as assistant superintendent of the Manchester Print Works, Manchester, N. H., under Supt. Schaeffer. Mr. Barr comes from Pawtucket, R. I., where he has been engaged as chemist at the Dunnell Works of the United States Finishing Company.

G.W. Ballard has assumed the duties of night superintendent of the Modena Cotton Mill, Gastonia, N. C.

John L. Batchelder, formerly with Harding, Whitman & Co., has been appointed manager of the cotton yarn department of Joshua L. Baily & Co.

Deaths.

John R. McFetridge, widely known in Philadelphia and vicinity, as president of the John R. McFetridge & Sons Co., printers, publishers, designers, etc., doing a large business with textile mills, died recently. The business will be continued by the company.

Cyrus Winchell, a pioneer woolen manufacturer, died last month in Rockville, Conn. He was born in Manchester in 1821, and went to Rockville when young and worked in the Springville mill for many years in the various departments. He then went to Wilbraham Academy, and on his return to Rockville became superintendent of the Springville mill, which position he held until 1856, when he went to Willimansett, Mass., taking charge of a woolen mill. In 1866 he returned to Rockville and secured control of the Springville mill, of which he was agent and treasurer until 1886, when the property was sold to the Hockanum Co. Since that time he had not engaged in active business.

Thomas S. Fuller, one of the best known men in the hosiery trade, died early last month at his residence, West Twenty-fourth St., New York, of heart disease. Mr. Fuller was born in this city April 14, 1836.

Theodore Connell died June 15th at Scranton, Pa., aged 32 years. Previous to his sickness he was connected with the management of the Lackawanna Mills at Scranton.

Capt. Joseph A. Carberry, for many years a well known dealer in knit wear goods, died last month at the offices of Sutton & Co., New York, with which firm he was connected.

Louis F. Rawitser, of Stafford Springs, Conn., died June 21st at Hamburg, Germany. He went to Germany on account of his health, and died the day of his arrival at Hamburg. He was 56 years of age, and is survived by a daughter, who accompanied him to Hamburg.

William Crabtree of the firm of William Crabtree & Sons, manufacturers of worsted yarns, Montgomery, N. Y. is dead.

New Publications.

Angora Goat Raising, with a Chapter on Milch Goats; by George Fayette Thompson, M. S.; American Sheep Breeder Co., Chicago, Ill.; price $1.00.

The rapid development of the Angora goat and mohair industry in this country during the past ten years, and the fact that waste land which is entirely unproductive can be utilized for raising these animals, has awakened a widespreading interest in this subject among farmers in every part of the country. The author of this work has presented in small compass a great deal of useful information regarding the raising of the Angora goat. He is a recognized authority on the subject and is well known through his connection with the Bureau of Animal Industry. He has spent many years in a careful study of the Angora goat and mohair industry, and has exceptional facilities for securing information on the subject. Following is an abstract of the table of contents: Origin and history of the Angora goat; description of the Angora goat; importers and importations; number of Angora goats and production of mohair; browsing and pasturage; mohair and mohair manufactures; the meat, the markets and the milk; localities adapted to Angora goat raising; the care of Angora goats; flock management; shearing, shears and shedding; diseases and other enemies; the skins and their uses; minor features of importance; milch goats.

The Year Book for Colorists and Dyers, Vol. V; H. A. Metz & Co., New York City.

This is an annual publication which has become a recognized feature in the trade. It presents a review of the years' advances in the printing, dyeing, bleaching and the finishing of textiles. Part 1 contains valuable tables most in use by dyers; Part 2 a list of the fibres in ordinary use for textiles, giving their particular characteristics. Then follows a list of the patents for 1902 covering dyestuffs and coloring matters, processes of application, chemical processes, machinery, etc. Part 4 contains notes of processes, new colors, etc., gathered from authoritative sources in this country and abroad. The new products are discussed in this section. A chapter is given to educational institutions which include dyeing in their curriculum. Next is a list of books of the year, and last, and perhaps most convenient of all, a list of dyestuffs, makers and methods which is of valuable ready reference for the trade. The book is compiled in attractive form and is of a size for convenient reference.

Hand Book of Practical Mechanics; by Charles H. Saunders, Boston, Mass.; price $1.25.

This is the second edition of a useful work compiled by a practical man for the use of practical mechanics. It contains much valuable information in a form that it is very convenient for reference by mechanics engaged in their daily work. All superfluous matter, so often found in books of this kind, has been eliminated. The large sale it has met with is sufficient proof of its merit.

The study of Textile Design; by Alfred F. Barker; E. P. Dutton & Co., New York; price $2.50.

An elementary treatise on textile design which is intended for self-instruction and for the first two years in textile schools. While beginning with the elementary principles of the art, the author has extended the scope of the book to include a great deal of technical information that is usually found only in advanced works. The illustrations are numerous, well selected and of excellent quality. The author expresses himself clearly and concisely; the descriptive matter is well arranged and unusually well balanced among the different subdivisions of the subject. Following is an abstract of the table of contents showing the ground covered by the work, which can be recommended for the information it contains as well as for the very attractive manner in which it is presented to the eye of the reader:

Simple Interlacings; The Preparation of the Warp for the Loom and the Elements of Weaving; The Hand and the Power Loom; The Science and Art of Cloth Construction; The Designing of Interlacings on Point-Paper; Sateen Figures; The Principles of Drafting; The Structure and Correct Use of Yarns; Analysis and Synthesis, Illustrated by Color and Weave Styles and Backed and Double Cloth Structures; The Manufacture of Lustre Goods; Elementary Calculations for Yarn, Cloth and Designing, and Advanced Calculations for Yarn and Cloth.

Color Matching on Textiles; by David Paterson, F. C. S., F. P. S. E.; D. Van Nostrand Co.; price $3.00.

The matching of shades is one of the most important and difficult operations in manufacturing textiles. The value of the finished goods depends in large measure upon whether they match in shade the sample by which they were sold. In view of the importance of the subject, it is strange that no manual of color matching had been issued previous to the appearance of the one now before us by David Paterson. The author's name is a high recommendation of the book, and an examination shows that it is up to the standard of his previous work as a writer on textile subjects. The work is an attempt to explain the complex phenomena of color matching and to assist the dyer in his work of making his colors match the sample. The reading matter is freely illustrated with dyed samples, diagrams, half tone engravings and a colored plate.

Wall Charts for Textile Technology; by Julius Zipser, Professor of the School for Arts and Crafts at Bielitz; A. Pichlers Witwe & Sohn, Wien, Austria; price per plate unmounted, $1.50; mounted with cloth back and wood sticks, $2.00.

We have received samples of these charts which are to the art of textile manufacturing what maps are to geography. Each chart is 43 inches high and 33 inches wide, and shows one machine on a large scale, which for many machines gives a full size representation. The machines are shown by an orthographic projection, the different parts being distinguished by different colors. The large scale, the clearness of the plates, together with the colors make these charts of great value in giving instruction in textile manufacturing and machine

construction. The different parts of each machine are denoted by letters to which reference is made in the written description which accompanies each chart. The first 10 tables will represent the following machines:

1. Top Flat Card for Cotton.
2. Intermediate Flyer.
3. Cotton Mule.
4. Fleece Divider with Straps for Woolen Carding.
5. Hot Water Frame for Flax.
6. Hand Loom.
7. Hand Loom.
8. Rotary Fulling Mill.
9. Double Gig.
10. Cloth Shear.

Twenty other tables are projected to represent different textile machines.

Samples of these valuable charts can be seen by calling at this office, and we strongly recommend them to the attention of all interested in textile education.

Textile and Soft Goods Trade of South Africa; by S. W. Witham; P. S. King & Son, London, England; price $3.50.

This is a report of a special commission appointed after the war by the South African trade committee, to visit South Africa and secure information upon the conditions of trade and industry in that country for the benefit of English exporters. The information was acquired on the spot and is now presented in book form, thus making it as available for American as for English traders. The investigations were confined entirely to textile goods and the report contains a great deal of information that could be acquired by private firms only at the expense of a great deal of time, money and effort.

Republic of Brazil; by Oskar Canstatt; Ferdinand Hirt & Sohn, Leipzig; 640 pages.

An elaborate work on Brazil, a country in which our German friends evince much more than usual interest, owing possibly to the opportunities which this vast and undeveloped territory offers for German enterprise. Beginning with a historical sketch, the work treats of the natural resources of the country, the present state of development and of the different industries. It is freely illustrated with half-tone engravings. The text is in German.

Business Literature.

The Evolution of the Handy Trap; E. M. Nichols, 639 Arch St., Philadelphia, Pa.

A folder illustrating and describing the evolution of the Handy steam trap, which has been adopted extensively throughout the country.

Noiseless Gearing; The New Process Raw Hide Co., Syracuse, N. Y.

A pamphlet in which are presented some of the facts concerning the new process raw hide gearing, which facts, by the way, are the strongest arguments that can be advanced in favor of the use of these gears which are now found in every branch of industry.

Pressure and Vacuum Gauges, No. 9; The Bristol Company, Waterbury, Conn.

A revised edition of The Bristol Company's catalogue to which have been added several types of pressure and vacuum gauges embodying important improvements.

Colors and Specifications; Joseph Dixon Crucible Co., Jersey City, N. J.

A convenient folder with the above title containing specifications for steel and iron paint and color work.

The Crawford Press; Spence & Rideout, Nashua, N. H.

A catalogue describing and illustrating the various types of presses built by the Nashua Steam Press and Boiler Works, Nashua, N. H. They include the heavy hydraulic press, the quick working hydraulic press, improved power screw press, screw press for knit goods and hosiery, and what is styled the water press. This is a water press that does not require the use of the pump for forcing air into the water chamber, its pressure being obtained by ordinary gravity pressure of water, 90 to 150 pounds being required. This type of press is very convenient owing to the ability to use it independently of a motor power mill.

Breaking Weight of American Warp Yarns; The Draper Company, Hopedale, Mass.

A card containing a table which gives the breaking weight of American warp yarn per skein for counts from No. 3 to No. 100. It is well arranged for reference and will doubtless be found useful by the trade.

Industrial Plants; by Ballinger & Perrot, architects, Philadelphia, Pa.

This is the second number of a publication issued by the above named architects and contains much information of value to manufacturers. The present volume begins with an article on "A Real Fire Proof Building." This is followed by a number of useful formulae for solving problems that frequently arise in every day work. The editorial entitled "Why do we Need an Architect or an Engineer?" shows clearly the danger if a manufacturer dispenses with the services of an engineer when laying out his plants. The pamphlet ends with an illustrated description of the Hugo Bilgram Machine Shop, for which the drawings and specifications were supplied by Ballinger and Perrot.

The Original Rubber Man; Boston Belting Co., Boston, Mass.

This is an interesting illustration of a man clothed all in rubber and standing on a rubber mat, the garments and mat being made of the products of the Boston Belting Co.

Volt, Ampere and Watt Meters, No. 10; The Bristol Company, Waterbury, Conn.

A catalogue containing a complete list of the recording volt, ampere and Watt meters manufactured by The Bristol Company. It includes several new instruments recently added to their very large line.

Graduation Exercises, Lowell Textile School.

The first graduating class to receive diplomas in the new school building numbered twenty-four, of whom three were women. The exercises were held on June 5, and opened with an address of welcome by President A. G. Cumnock. He was followed by Edward F. Greene, of Boston, who spoke on "The Relative Importance of Textile Manufacturing". Mr. Greene presented the gold medal of the New England Cotton Manufacturers' Association to the student having the highest mark of efficiency in the cotton course. The margin had been very close between two students, Frederick Ellery Chamberlin, of Boston, and Edward Fuller, of Adams, Mass. The final decision was to award the medal to Mr. Chamberlin and give honorable mention to Mr. Fuller. The latter read a very valuable thesis on "A Comparison of American Grain and Imported Egyptian Cotton".

Theses were then read by: Orison S. Campbell, "An Investigation of the Uniformity of Twist in Worsted Yarn"; Isabel H. Reynolds, "Notes on the Production of Fine Fabrics"; Walter L. Stewart, "Textile Colorings as Applied to Suitings"; Wilfred N. Bloom, "Sulphur Colors".

Trustee James T. Smith, "Father of the Lowell Textile School", then delivered an interesting and practical address to the graduating class of which the following is an abstract:

"It is customary on these occasions to saturate graduates with advice but whether or not it bears fruit in after years, is a question. Inequality is the law of human nature. Do not try to beat some one else. This inequality, mentally, is not apparent among those who are held down, who are oppressed. It was not evident among the galley slaves of olden times. But with modern conditions, the stope has widened.

"Let it be your first duty to preserve your liberty. It is well to become acquainted wih yourself. Choose your vocation and with your education and knowledge of yourself, start out.

"Capacity for endurance is essential. I have a desire that physical training be a requisite of the school, and I am glad to see you have taken hold of what opportunity you have. 'Be sure you are right, and then go ahead' is good advice. Be not ashamed to perform honorable, humble duty. Be sure the preparation is there, and have faith that the opportunity will come, and you will achieve success. A workman's future can be predicted by noticing when the bell rings whether he throws his load into the wagon or drops it. He who thinks to win by unfair advantage over his competitors, is, some day, going to find one sharper than he, while on the other hand sterling integrity and energy will always tell.

"Now get a position. Hitch on wherever you can. Give compensation. Work for your employer's interest. If you strike an employer who wants everything for nothing, stay under the strict discipline for a year. It'll do you good. The employer is always on the lookout for merit and is always ready to pay for it. The humblest workman is as ambitious and wise as the man higher up. The good employer will always recognize merit and pay for it. A failure to do so, has often been the means of unsuccess in business.

"Speculation has brought more men to grief than anything else. The best thing that can happen to a man is to lose on his first venture. If he wins at first he will keep on. He gets deeper and deeper, and it grows upon him more and more. Keep away from speculation. Be thrifty. Keep an expense account. Never lose track of a cent. Lose a dollar but keep track of the cents."

The diplomas were presented by W. W. Crosby, principal of the school. Much interest was shown when Miss Reynolds, of North Andover, received her diploma, as she was the first woman to receive a diploma from the mechanical course of the school. The graduating class was as follows:

Arthur Feiling Ferguson, Roxbury, Mass.; George Fuller, Adams, Mass.; Fred Clifton Morrison, Dover, N. H.; Frederick Ellery Chamberlin, Jamaica Plain, Mass.; John Sigmund Rosenthal, Newton, Mass.; Orison Sargent Campbell, Ware, Mass.; Frank Warren Emerson, Lawrence, Mass.; Fred Newman Snelling, Haverhill, Mass.; William August Rasche, New York City; Alfred Whitney Evans, Haverhill, Mass.; William Robinson Evans, Haverhill, Mass.; Wilfred Nathaniel Bloom, Boston, Mass.; Garabed Najarian, Rowley, Mass.; George Edward Petty, Lowell, Mass.; Murray Reid Stephenson, Clinton, Mass.; William Carleton Robinson, Melrose Highlands, Mass.; Louise Porter Campbell, Lowell, Mass.; Isabel Halliday Reynolds, North Andover, Mass.; Anna G. Walker, Lowell, Mass.; E. H. Bennett, Lynn, Mass.; Edward Spiegel, New York City; Clarence Hutton, Lowell, Mass.; Benjamin Holgate, Lowell, Mass.; Walter Lawrence Stewart, New York City.

Graduating Exercises of the Philadelphia Textile School.

The commencement exercises of the Philadelphia Textile School were held in Horticultural Hall on June 4. A large audience paid close attention to an address delivered by Edward Howard Griggs on "Art for Life's Sake." The diplomas were delivered by Pres. Theodore C. Search, assisted by the principal, Leslie W. Miller and E. W. France, to the following:

Nathan Monroe Bachman, Stephen Holla Garner, Frank William Hoffman, John Kellard, Jr., William Joseph Maurer, Herbert Wright Spaulding, Harry Taylor.

Much interest was shown in the awarding of the following prizes, to secure which there was an earnest rivalry on the part of the students.

Associate Committee of Women's Prize, $10.00, for best executed work in Jacquard design, third year, awarded to Frank Hoffman; honorable mention to John Kellard, Jr. The Miss Clyde Prize, $10.00, for best executed work in Jacquard design, second year, awarded to J. Titus Aungst; honorable mention to Louis E. Ruehlman. Mrs. Frank K. Hipple Prize, $10.00, for special work, awarded to Eugene Parks Bradley. The Elizabeth C. Roberts Prize, $10.00, for best work in color harmony and design, awarded to J. Everett Emerson; honorable mention to Evan G. McIver and Schuyler J. Taylor. The Textile World Gold Medal, for general excellence in chemistry and dyeing, awarded to Leicester DaCosta Ward; honorable

mention to Arthur Clarence Stifel. New England Cotton Manufacturers' Association Medal, for general excellence, awarded to William Joseph Maurer; honorable mention to Stephen H. Garner and Harry Taylor. Dyer's Trade Journal Prize, chemical balance, for best results in textile printing, awarded to Arthur Clarence Stifel; honorable mention to David Leonard Malcolm. Prize Scholarships for school year, 1903-1904, awarded to Abraham A. Levy, Evan G. McIver and Frank M. Kaufmann.

At the close of the exercises the audience were invited to a reception and garden party given by the Warp and Weft Club and the Girls' Industrial Art League. A very interesting exhibit was made by the students in the School of Applied Art and the Textile School. A meeting of the alumni association was held on Friday evening at which a number of valuable papers were read, as follows:

"Silk Industries of America and Europe", by Harland J. Maynard: "Shoddy, Its Uses and Abuses", Channing Smith; "Plush and Plush Weaving", Frederick Pfeiffer; "Dyers and Dyes", James J. Gass; "Cotton Frames in the South", Arthur L. Ware; "The Ingrain Carpet Industry", Robert J. Carson. At the banquet in the evening, Edward Page, of New York, spoke on "Textile Graduates in the Selling Agency", and Morris Benjamin, of S Stein & Co., New York City, spoke on "Imported and Domestic Woolens."

Graduation Exercises of the New Bedford Textile School.

The graduation exercises of the New Bedford Textile School were held June 5. An addresss was made by Herbert E. Walmsley, his subject being "On Behalf of the New England Cotton Manufacturers' Association"; John W. Knowles, "On Behalf of the Manufacturers"; William Hall, "On Behalf of Labor". The address to the graduates was made by Hon. Rufus A. Soule. The New England Cotton Manufacturers' Association medal was presented by John McCullogh. Isaac B. Thompson delivered the diplomas to four graduates of the day class and certificates to seventy-seven members of the evening class.

Change of Firm Name.

The well known firm of Eichmann & Sternberg, 530 Broadway, New York City, has been succeeded by the firm of Fred Sternberg & Co. They handle a full line of foreign and domestic yarns and are now better equipped than before to serve the interests of the trade.

Philadelphia Branch Office.

Stephen M. Weld & Co., dealers in cotton at 22 Weld St., New York City, announce to the trade that they have opened a branch office at 208 Chestnut St., Philadelphia, Pa. It will be under the management of Irvin King, who has been connected with the firm for many years. This will place them in close touch with the Philadelphia trade to which they will be prepared to quote prices on various grades of cotton and insure prompt delivery.

Allis-Chalmers Co.

Among the engine sales reported by the Allis-Chalmers Co., Chicago, Ill., for the month of May, 1903, we note the following:

Northwestern Elevated Railway Co., Chicago, Ill.; Takata & Co., New York City; Tintic Mining & Developing Co., Salt Lake City, Utah; George M. Moulton & Co., Chicago, Ill.; Madison Cotton Oil Co., Vicksburg, Miss.; Delaware & Hudson Co., Scranton, Pa.; Munising Paper Co., Munising, Mich.; North Carolina Cotton Oil Co., Charlotte, N. C.; Illinois Steel Co., Chicago, Ill.; Paul L. Reinke, Strangelville, Wis.; East Rockford Mantel Co., Rockford, Ill.; Chas. B. Pride, Appleton, Wis.; G. W. Faison, Jr., Shaws, Miss.; Cananea Consolidated Copper Co., New York City; Gluck Mills, Anderson, S. C.; The Martin-Barriss Co., Cleveland, Ohio; St. Louis Exposition, St. Louis, Mo.; The National Tube Co., Pittsburg, Pa.; Calumet & Arizona Mining Co., Arizona; Board of Public Works, Kansas City, Mo., duplex double acting Riedler pump, four-cylinder triple expansion Corliss engine, two special suction surface condensers, condenser piping and air pumps, and air pump piping and separator drain pumps.

Mill Telephone Systems.

The Stromberg-Carlson Telephone Manufacturing Co., W. Jackson St., Chicago, is putting on the market a new intercommunicating telephone for interior systems. The company, which is now the largest independent manufacturer in its line in the country, if not in the world, started less than ten years ago, manufacturing only interior telephones. They have since branched off into making other kinds of telephones but have been adding various improvements on their interior telephones. They claim these latter are now the best on the market. They have received a series of testimonials from a number of the largest houses in Chicago who have installed Stromberg-Carlson interior telephone systems. Among the firms endorsing these instruments are the following: The Cable Company, A. H. Vilas Company, W. D. Gibson Co., Geo. B. Carpenter & Co., W. W. Kimball Co., Kuh, Nathan & Fischer Co., The Royal Tailors, Scoville Manufacturing Company, and Steele-Wedeles Company.

Patent Decision.

We are informed that the suit for infringement brought by the Klauder-Weldon Dyeing Machine Company of Amsterdam, N. Y., against the Steadwell Dyeing Machine Co., for infringement of one of their garment and stock dyeing machine patents has been decided in favor of the Klauder-Weldon Dyeing Machine Company by the Hon. George W. Ray, United States judge of the Northern District of New York. A decree has been entered and injunction issued restraining the Steadwell Company from continuing the infringement.

The Situation in the South.

In June Mr. T. L. Wainwright, the president of the Southeastern Cotton Manufacturers' Association, which comprises many of the largest mills in the South, sent out to the members a circular requesting certain information referring to their stock of cotton; average number of hours being run; contemplated curtailment, if any; production on hand unsold. These letters were sent also to many other mills in the South besides members, and replies were received from about 75 per cent. of the mills addressed. These have been carefully tabulated, and the information obtained is set forth in a statement issued June 26th, as follows:

The answers to my first question, as to how long the present stock of cotton would keep the mills in full operation, is so varied and indefinite that it is impossible to arrive at an accurate average date, but the best estimate I can compile from them would indicate the average date as August 20th to 25th.

The answers to question No. 2 shows the average number of hours being run weekly as 60. With few exceptions the mills running full time, run 66 hours weekly, this showing an average curtailment of time throughout the South of about 9 per cent., or say 6 hours weekly.

Answers to question No. 3, as to the contemplated curtailment of production, show that from and after July 1st there will be a curtailment of about 18 per cent., making a total of 27 per cent. short time after July 1st. This does not include the mills that have already shut down entirely (including those destroyed and seriously damaged by the recent cyclone and flood, which causes an entire and indefinite suspension of all operations). This entire suspension will amount to 22 per cent., thus making a total average curtailment of production after July 1st of about 49 per cent.

Answers to question number 4, as to the production on hand unsold: Will say that 95 per cent. of answers show no production on hand unsold, about 50 per cent. of which are sold ahead to an average date of about September 10th to 15th, some being sold up to the end of the year. The small percentage who have any goods on hand have very small stocks.

Many of the replies are very elaborate and interesting, freely expressing opinions as to the future outlook for the cotton and cotton goods trade.

A careful study of all the replies warrants the conclusion:

FIRST: That the predicted cotton famine will prove a stern reality with a large percentage of mills before a new crop can be harvested and marketed.

SECOND: That there are enough mills now running short time (to say nothing of those contemplating doing so) to curtail the production well below the wants and demands of the consumers.

THIRD: That there is the smallest imaginable accumulation of goods in first hands, hence cotton goods have not been in a stronger statistical position for many years, and that they will, at an early date, command full values, on a parity with cotton; is little short of a certainty.

Many mills with a full supply of cotton, who claim they will run full time to a new crop, say they will give a full week for the 4th of July holidays, while as a rule they give from one to two days. A few others shut down for a week, more or less, for needed repairs (?). These two items alone will largely curtail production.

With the greatest scarcity of cotton and the lateness of the crop (which is variously estimated at from two to three weeks), cotton is placed in the strongest statistical position since the year of 1872, when it sold for 27 cents per pound, and it is reasonably certain that cotton must remain high at least until about November, and possibly much longer. Nearly all the mills answering insist that they will demand full values for goods in the future.

Too much importance cannot be placed on the recommendation of the American Cotton Spinners' Association, at their recent annual convention, that production be curtailed materially. It is the best and only certain remedy for the present unprofitable situation, and if carried out in good faith will redound to the interest of all the mills.

I have endeavored to give the fullest and most accurate information possible from the many letters I have received from the cotton mills throughout the South, and I hope it will be of interest and benefit to all concerns.

Thanking you for your prompt and satisfactory replies, I am,

Yours very truly,
T. L. WAINWRIGHT,
Pres't Southeastern C. M. Association.

Correction.

Through a typographical error in the advertisement of Henry H. Skevington & Co., on page xv, in the 1903 American Directory of the Knitting Trade, the word "striper" appears. This should have been "stripper." Manufacturers interested in that particular line of machinery, however, would note at a glance that it was merely an error, as the striping of hosiery is out of the market, but the stripper on a singeing machine is a new idea and a specialty that the above firm has made quite a reputation for. Out of justice, however, to Messrs. Skevington & Co. we are glad to draw attention to the error.

Geigy Aniline and Extract Company.

Announcement has been made under date of July 1 by John J. Keller & Co., Inc., 104-106 Murray St., New York City, with branches at Boston, Providence, Philadelphia, Atlanta and Toronto, that they have transferred their entire business to the Geigy Aniline and Extract Company, which company assumes the liabilities and assets of the business under the same management as before. The new corporation has been organized under the laws of New York with the same management and with the same staff as that of their predecessors. The firm of John J. Keller & Co., and later the corporation under the same name, have long been the sole agents in this country for the Aniline and Extract Works at Basle, Grenzach, Rouen and Moscow, formerly John R. Geigy. The new company will continue to be the American branch of this concern and carry on as before the business of importing and manufacturing aniline colors, dyestuffs, extracts, etc.

A German Visitor to this Country.

Mr. A. Rieppel, of Nurnberg, Germany, the managing director of the Augsburg Nurnberg Manufacturing Co., well known for many years as one of the largest and most successful builders of structural iron work, engines, cars, bridges, etc., in Europe, is now visiting this country for the first time. His works employ about 16,000 men and now have over 2,000 at work on the bridges, etc., of the new railroads being built by Germany in China.

Their latest success has been with gas engines, both for gaseous and liquid fuel. They have long built these engines in smaller units up to 400 H. P. and operated with petroleum, but for the use of waste gas as well as producer gases and in larger units they have recently developed an entirely new design constituting the result of many years of extensive experience. The engine which is of the double acting four cycle type, generally in tandem arrangement, is best adapted for the various purposes of modern power development up to the largest units required by municipal central stations and iron and steel works.

Mr. Rieppel's visit to this country was made to interest the Allis-Chalmers Company in the manufacture of the products of his company and by mutual agreement to enable each or either of them to get into closer touch with the requirements of the trade throughout the world. A contract was entered into by the two firms, giving the Allis-Chalmers Company the exclusive right to manufacture and sell the Nurnberg gas engine for this country and selling rights in many foreign countries, especially the Far East and South Africa.

The Augsburg Nurnberg Manufacturing Company, under the direction of Mr. Rieppel, have made a phenomenal success with this new gas engine, having within the past few months received orders for some 50,000 H P. throughout Germany and Spain, chiefly for generating electric energy and for blast furnaces and spinning mill work. One of these engines now being built is for an important spinning mill in Northern Germany where the engine will be operated by producer gas.

Mr. Rieppel is now on a tour of inspection throughout this country, after which he will visit the new and extensive works of the Allis-Chalmers Company at West Allis, where these engines will be built.

—Since Agent A. S. Lyons of the Bigelow Co. has been in charge of the Lowell Mill, formerly the Lowell Carpet Co., there have been great improvements. Some six or eight new mills and additions have been built and now their ground is almost covered by mill buildings. In building the last mill the company pulled down a block in which one man, who had worked for them, lived for 50 years. He felt so badly about it that it caused his death.

—Coronet Worsted Co., Mapleville, R. I., have placed a repeat order for the Green economizer with the Green Fuel Economizer Co., 53 State St., Boston. The Algonquin Printing Co., Fall River, Mass., will also install a Green economizer.

Purifying Water.

Wm. B. Scaife & Sons Co., of Pittsburg, Pa., sole manufacturers of the We-fu-go and Scaife water softening and purifying systems have found it necessary to build an addition to their present plant at Oakmont, Pa., to accommodate their increased business in this line, and have just completed the erection of a new shop 60 feet wide by 100 feet long, equipped with the latest improved machinery, which will be used exclusively for manufacturing the We-fu-go and Scaife systems, in addition to their present shops.

They have at the present time, systems aggregating 95,000 h. p. under construction for steam boiler plants, in addition to plants for softening water to be used in manufacturing processes such as dyeing and bleaching in woolen and cotton mills, and for washing in laundries.

Personal Mention.

Mr. William Burlingham has accepted an appointment as chief engine designer with the B. F. Sturtevant Co., of Hyde Park, Mass., resigning a position in the United States Inspection Office with the Wm. R. Trigg Co., of Richmond, Va. Mr. Burlingham has previously been associated with the Bath Iron Works, the General Electric Co., the Southwark Machine & Foundry Co., and the Newport News Ship-Building & Dry-Dock Co. He has also served on Mr. T. A. Edison's staff at the East Orange Laboratory and is a graduate of the Worcester Polytechnic Institute.

The S. Morgan Smith Co. Open a New England Office.

The S. Morgan Smith Company of York, Pa., one of the largest builders of water wheels in the country, and who have been making a specialty of McCormick turbines, have recently opened an office in Boston at 176 Federal St., in charge of Mr. Herbert C. Daggett, engineer and New England agent. Mr. Daggett has a wide acquaintance in New England and great experience in this line of business, and New England manufacturers interested in the subject of turbines and wheels will find Mr. Daggett able to afford them valuable information. A new catalogue, "Fifth Edition," has recently been issued, containing photogravures of a number of important installations, which may be had upon application.

Busy Mills.

The Lincoln Manufacturing Company, Chester, Pa., are very busy running their mill on weaving yarns with 12,000 spindles, D. I. Trainer, superintendent. This company has a capital of $200,000. The fine textiles made by the Jordan Manufacturing Company, we are informed, have been meeting with wide success. They are very busy operating their 600 looms and report having more orders than they can fill. The company also does its own dyeing, Mr. Robert Kineavy being the superintendent.

Buffalo Forge Co.

The Buffalo Steam Pump Company, whose works are at North Tonawanda, has been purchased by Messrs. William F. and Henry W. Wendt, who are also owners of the Buffalo Forge Company and the Geo. L. Squier Manufacturing Company. The North Tonawanda Works of the Steam Pump Co. are to be continued as heretofore and the main offices will be in Buffalo.

Western Massachusetts Portrayed.

Western Massachusetts is a section of New England which has never received its just dues . the way of praise and popularity concerning the many ideal qualities which make it a perfect resort during the summer months.

Noted for its pure air which is particularly healthful and invigorating by reason of its high altitude and its delightful situation close to the beautiful Berkshire Hills and the impressive Hoosac Mountains, it is a perfect haven for the vacationist who seeks health and rest.

The natural beauties of this portion of Massachusetts are numerous, and it was here that Hawthorne and Beecher derived inspiration for some of their best writings.

The Boston & Maine Railroad Passenger Department at Boston publishes an interesting booklet of fifty-five pages which gives a detailed and comprehensive description of this region, also a magnificent portfolio of views containing thirty-three perfect photographic views of the most beautiful scenes along the Fitchburg Division. The title of the descriptive book is "Hoosac Country and Deerfield Valley," and of the portfolio, "The Charles River to the Hudson". These views comprise also some pictures of that famed historical and scenic country, Eastern New York. The title is printed on the outside of the cover in gilt embossed letters giving a beautiful and artistic finish to the book. This book will be mailed upon receipt of six cents in stamps and the descriptive book upon receipt of two cents in stamps or eight cents for both.

Change of Address.

On and after July 1st the general offices of the American Knitting Machine Co., which have heretofore been in Philadelphia, will be moved to their shop at Woonsocket, R. I., and all communications with the company should be addressed to American Knitting Machine Company, Woonsocket, R. I. The Philadelphia office will be closed.

Sailed for Englai d.

Mr. Stephen C. Lowe, sole importer for the United States and Canada, for the widely known English cotton machinery firm of John Hetherington & Sons, Ltd., of Manchester, England, was one of the passengers on the Saxonia, which sailed for Liverpool Tuesday, June 30th. Mr. Lowe was accompanied by his son, Master Stephen C. Lowe, Jr.

Jersey the Summer Paradise.

There are regions well known and resorts which are popular, but no one State has as many famous resorts as the New Jersey coast. To reach it is neither difficult nor tedious because the journey begins with an hour's sail down New York Bay to Atlantic Highlands on the Sandy Hook boats, and then the rail trip leads along the Jersey shore to the innumerable points from which may be selected the vacation place. The boats are frequented by the most famous brokers, bankers, professional and business men of New York City, who have summer homes at the seashore, and the resorts are as famed as their summer residents. Upon reaching the Highlands there is ample express train service to Navesink, Normandie, Seabright, Monmouth Beach, West End, Long Branch, Elberon, Deal, Allenhurst, Asbury Park, Ocean Grove, Avon, Belmar, Spring Lake, Manasquan, Point Pleasant, Red Bank, Matawan, Freehold, and other well known resorts, each of which has its own specific attraction, but the main feature, of course, is the bathing, and at the majority of these places there is both salt and fresh water bathing. For the yachting enthusiast the Jersey coast is unequaled, while in the matter of good roads for which New Jersey is noted, the section in which the above resorts are situated is far famed and in every direction there are charming roads for walking, driving and automobiling. Every effort is exerted for the pleasure and comfort of the summer tourist, and the hotels, numbering into the hundreds, are well kept houses. Besides the Sandy Hook Route the New Jersey Central has all rail line to the Jersey coast, and its fast express service leaves New York from its stations at foot of Liberty Street, N. R., and South Ferry. All trains are equipped with the latest designed Pullman Parlor Cars and Coaches, and upon application to C. M. Burt, Gen'l Passenger Agent, Central R. R. of New Jersey, (z-6) New York, a hotel book and sea shore time table will be sent you; they are free for the asking.

Wool Shoddies.

C. R. Simister & Son, Manayunk, Pa., manufacturers of camel's hair and wool carpet shoddies, have recently added to their already extensive mill a complete and up-to-date plant for the manufacture of fine all-wool shoddies, and have secured the services of Mr. Harry W. Myers, one of the best known salesmen on the road, as their representative.

Indiana. Cannelton. The Cannelton Cotton Mills are being operated but three days a week on account of the high price of cotton.

Oregon. Bandon. The Bandon Woolen Mills may be enlarged.

Recent Textile Patents.

BALING PRESS. 728,760. Henry D. Reese and Lewis Blount, Abbeville, S. C., assignors of one-third to Milton B. Reese, Abbeville, Ga.

BALING PRESS INDICATOR. 728,515. P. and L. Trabue, Girard, Ill.

BALING PRESS TENSION BAND. 728,516. P. and L. Trabue, Girard, Ill.

BRAIDING MACHINE. 727,926. John J. Feeley, Manton, R. I.

BOBBINS, COPS, ETC. Machine for Packing. 730,432. Dickerson G. Baker, Willimantic, Conn., assignor to the American Thread Co.

BLEACHING Textile Fabrics. Apparatus for. 729,574. Max Haas, Aue, Germany.

CALENDER ROLL Safety Clamp. 731,122. Henry A. Owen, Whitinsville, Mass., assignor to the Whitin Machine Works, Whitinsville, Mass.

CLOTH - SHEARING MACHINES. Lifting Mechanism for the Cutting Parts Of. 721,903. Edwin H. Marble, Worcester, Mass., assignor to Curtis & Marble Machine Company, Worcester, Mass.

LOOMS, ELECTRICAL. Jacquard Mechanism for. 727,023. Jan Szczepanik, Vienna, Austria-Hungary, assignor to Societe des Inventions Jan Szczepanik & Co., Vienna, Austria-Hungary.

LOOM SHUTTLE. Controlling Mechanism. 726,573. Charles F. Roper, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

CARD PUNCHING Machine. Jacquard. 729,495. Walter W. Hodgson, Philadelphia, Pa., assignor of two-thirds to William E. Beatty and Fred Sutcliffe, Philadelphia, Pa.

CARD PUNCHING Machines. Apparatus Applicable to Jacquard. 729,340. Thomas Hill and Peter Pearson, Nottingham, England.

COMBING MACHINE Drawing Motion. 730,711. James Slater, Ashton-under-Lyne, England, assignor to Sydney Mason, Ashton-under-Lyne, England.

COTTON CLEANER. 730,763. Elijah B. Ham, Jennings, Oklahoma.

COTTON, Cleaning Ginned. 730,158. Henry Rembert, Houston, Texas.

COTTON COMPRESS. 730,347. Pearl K. Crowell, Memphis, Tenn., assignor to Planters Compress Co., Memphis, Tenn.

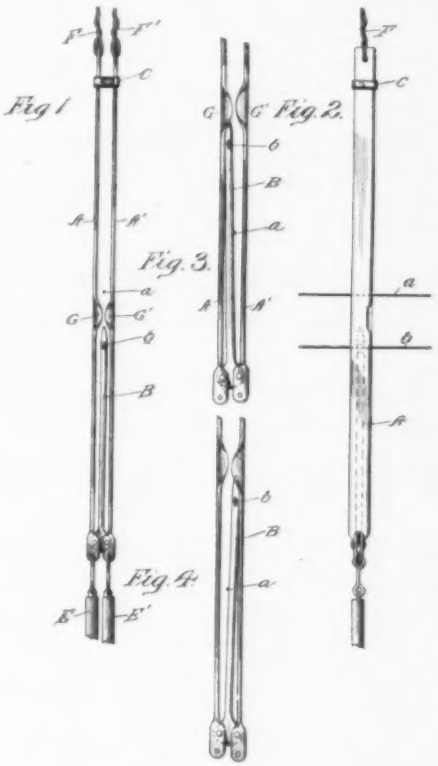
COTTON PICKING SACK or Receptacle. 730,325. Lucinda J. Wilson, Lawton, and Charles W. Wilson, Linden, Oklahoma.

FABRIC RACKING MACHINE. 731,014. Hubert Bittner, Vienna, Austria-Hungary.

FIBRE CLEANING MACHINE. 730,701. Manuel Prieto, Mexico, Mexico.

HEDDLE AND LENO CORD Stripe Motion. Needle. 729,106. Horace H. Sutcliffe, Philadelphia, Pa.

This invention relates to attachments for looms designed for cross-weaving. Its object is to enable



the doup-thread or warp-thread to pass over one or more of the free or regular warp-threads between each shot of weft or after a predetermined number of shots of weft, whereby corded effects, leno-selvages, etc., may be produced.

More specifically, the objects of the invention are to dispense with the use of an auxiliary heddle to lift the doup or whip thread, to avoid the necessity of having the lifting-cords that are attached to the jacquard or shaft of the loom extend through the warp, to dispense with any means for supporting the attachment other than the lifting-cords that operate it, to permit the insertion of the attachment in a loom having the regular warps already in place, to simplify the operation of the device by avoiding any vertical movement of the needle relatively to the heddle-frame, to actuate the needle wholly by the lifting of the heddle-frame, to enhance the certainty of operation of the attachment, and generally to simplify and cheapen the construction of the attachment.

It consists of a construction wherein the doup-needle is connected or pivoted to the heddle-strips in such a manner as to be tilted toward one or the other heddle-strip by their alternate operation, being thereby caused to pass alternately on one side or the other of the regular warp thread or threads extending between the heddle-strips.

In the drawings, Figure 1 is a front view of the attachment; Fig. 2, a side view thereof; Figs. 3 and 4, front views of a portion of the attachment when the same is lifted to throw the doup-needle thread to one side or the other, respectively, of the regular warp-threads.

LOOM. 731,274. John C. Brooks, Paterson, N. J., assignor to Draper Co., Hopedale, Mass.

LOOM. 731,112. Hamilton Landsay, Glenville, Ohio.

LOOM Banding Machine. 730,516. Frederick S. Culver, Taunton, Mass.

LOOM Dobby Mechanism. 729,627. John T. Meats and James E. Greensmith, Taunton, Mass., assignors to Mason Machine Works, Taunton, Mass.

LOOM. Filling Replenishing. 729,006. Edward S. Stimpson, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM Harness Mechanism. 729,102. Edward S. Stimpson, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM HARNESS RETRACTOR. 729,190. Clarence I. Knox, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM JACQUARD MECHANISM. 729,706. Jules Verdol, Lyons, France.

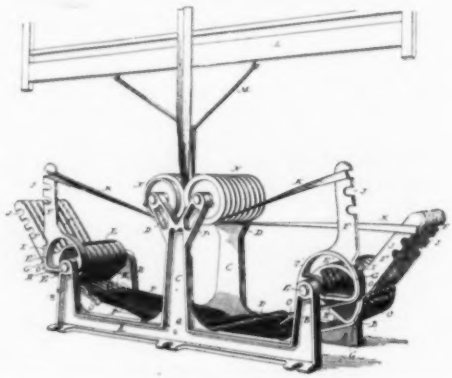
LOOM, SWIVEL. 728,052. Joseph Wadsworth, Paterson, N. J.

LOOM PICKER Stick Lug Strap. 730,743. Robert G. Campbell, Greensboro, N. C., assignor of one-half to Caesar Cone, Greensboro, N. C.

LOOM PICKING Mechanism. 729,626. John T. Meats, Taunton, Mass., assignor to Mason Machine Works, Taunton, Mass.

LOOM UNDERMOTION. 727,027. Gustave J. Tharan, Philadelphia, Pa.

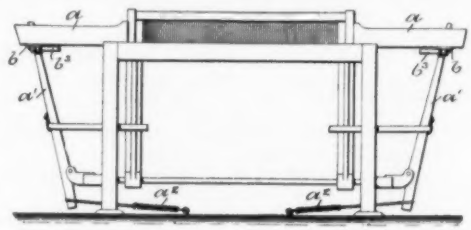
The object of this invention is to provide an undermotion or spring board for looms which will permit a maximum amount of movement of the harness frames and at the same time place a minimum amount of strain upon the springs, and, further, in



so constructing and arranging the parts that the adjustment of the cams and springs may be readily varied according as the movement of the harness be small and the work light, or the movement large and the work put upon the springs correspondingly heavier.

LOOM PICKER Stick Check. 729,229. George M. Smith, Berkeley, R. I., assignor of one-half to Charles H. Collins, Berkeley, R. I.

The object of this invention is to prevent any rebounding and chattering of the picker-sticks when they have reached their outward limit under the impulse of the floor-springs, and to hold the picker-sticks under spring tension in their proper



position to throw the shuttle from the shuttle-boxes.

It consists in the peculiar and novel construction of a spring-check attached to the under side of the shuttle-boxes, having two flat bent springs, forming a clip for receiving, checking, and holding the picker-sticks under spring tension.

LOOM SHUTTLE. Self-Threading. 729,086. Jonas Northrop, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

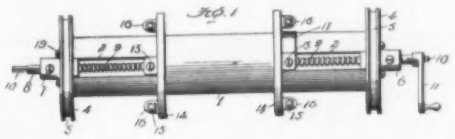
LOOM TAKE-UP Arresting Mechanism. 729,593. Robert Jamieson, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

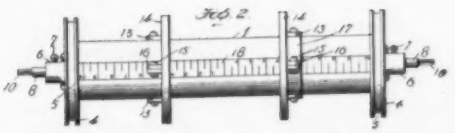
LOOM TAKE-UP Arresting Mechanism. 729,644. Jonas Northrop, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM TAKE-UP Control. 729,668. Charles F. Roper, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM WARP BEAM. 729,496. Aristide Jobert, South Manchester, Conn.

This invention relates to new and useful improvements in warp-beams for looms, and its ob-

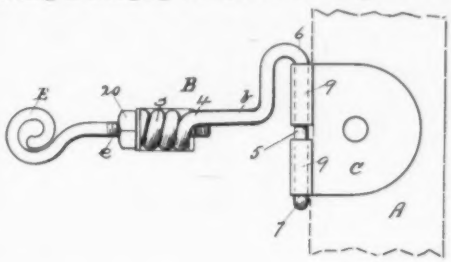


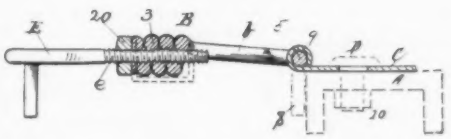


ject, among other things, is to provide a beam of compact and durable construction having means whereby the flanges employed for regulating the width of the warp on the beam may be simultaneously adjusted from or toward each other.

SPINNING MACHINE Yarn Guide Holder. 730,492. Carl G. Tideman, Worcester, Mass., assignor of one-half to Nils Nilson, Worcester, Mass.

This invention relates to a hinged yarn-guide holder constructed of wire and to the manner of arranging and combining the parts for adjusting and retaining the guide in the holder and for affording a swinging connection of the guide-holder





with the thread board or rail. Its objects are to provide a simple, inexpensive, and substantial means for providing a guide-holder made from wire and having facilities for the proper support and detachable affixment of the guide-eye stem therein, also for the adjustment of the parts for bringing the guide-eye into correct relation to the spinning-spindle.

SPINNING RING. 729,708. George M. Warren, Newton, Mass.

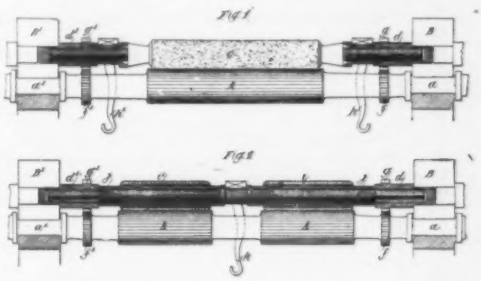
SPINNING SPINDLE 729,221. Alonzo E. Rhoades, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

SPINNING STOP-MOTION. 729,384. Walter G. Morrison, Willimantic, Conn. Huber Clark, administrator of said Morrison, deceased, assignor to the Atwood-Morrison Company, Stonington, Conn.

SPINNING and Twisting Machine. Combined. 731,272. Edward E. Bradley, Stonington, Conn., assignor to the Atwood-Morrison Co., Stonington, Conn.

SPINNING MACHINE. Drawing Apparatus. 727,518. Frederic ter Weele, St. Die, France.

This invention relates to improvements connected with drawing apparatus employed in spinning and combing for the purpose of reducing the pressure



to be exerted upon the pressing cylinders or rolls to a minimum, to insure to these cylinders a longer life, and especially to produce a more regular draft.

SPINDLES. Means for Connecting Spools or Bobbins to. 729,095. Francis J. Rabbeth, Redlands, Cal.

SPINNING MACHINERY Yarn Controller. 731,409. Sugden Schackleton, Keighley, England, assignor to the firm of Prince, Smith & Son, Keighley, England.

SPINNING MULE. 727,349. Henry S. Golland, Worsley, and John D. Whyte, Manchester, Eng.

WOOL WASHING Suds. Treating. 730,305. Charles Shepherd, Providence, R. I.

WOVEN FABRIC. 729,161. Charles H. L. Hanson, Philadelphia, Pa., assignor to John H. Bromley and Edward Bromley, copartners trading as John Bromley & Sons, Philadelphia, Pa.

LOOM WARP and Weft Stopping Mechanism. 727,733. William H. Baker, Central Falls, R. I., and Frederic E. Kip, Montclair, N. J.

LOOM FOR WEAVING PILE FABRICS. 727,521. Matthew J. Whittall, Worcester, Mass.

LOOM TAKE-UP Mechanism. 729,669. Charles F. Roper, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM TAKE-UP Mechanism. 729,645. Jonas Northrop, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM TAKE-UP Mechanism. 730,404. Charles W. Russell, Providence, R. I., assignor to Draper Co., Hopedale, Mass.

LOOM. PILE FABRIC. 730,438. Thomas B. Dornan, Philadelphia, Pa.

LOOM PILE Wires. Means for Lubricating. 730,201. Charles Baulk, Kidderminster, England, assignor of one-half to James Humphries & Sons, Ltd., Kidderminster, England.

LOOM PROTECTOR Mechanism. 731,391. Edward S. Stimpson, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

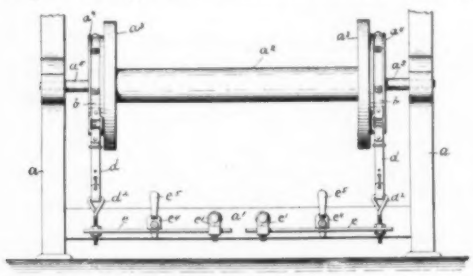
LOOM PROTECTOR Mechanism. 729,039. Howard W. Bracken, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM SELVAGE Motion. 729,046. Clare H. Draper, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM SHEDDING Mechanism. 729,146. Walter T. Emery, Dedham, and Estelle M. Emery, Taunton, Mass., administrators of Abram D. Emery, deceased, assignors to Draper Co., Hopedale, Mass.

LOOM WARP. Let-Off Mechanism. 728,001. James M. Peckham, Fall River, Mass., assignor of one-half to Richard Thackery, Fall River, Mass.

The object of this invention is to construct a cheap and simple let-off mechanism which has no



disconnected parts and which permits the warp-beam to rock on its bearings, so as to yield to the extra strain in forming the shed and automatically recovers the slack caused by the closing of the shed.

LOOM WARP BEAMS. Journal Bearing for. 731,123. Oscar L. Owen, Whitinsville, Mass., assignor to Whitin Machine Works, Whitinsville, Mass.

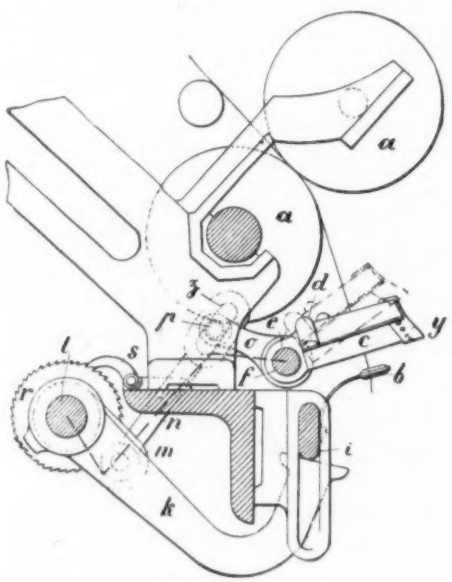
LOOM WARP Stop Motion. 729,960. Henry A. Owen, Whitinsville, Mass., assignor to Whitin Machine Works, Whitinsville, Mass.

LOOM. Weft-Replenishing. 729,401. Ira F. Peck, Auburn, R. I., assignor to Draper Co., Hopedale, Mass.

RING FRAME Spindle. 731,111. Thomas E. Leigh, Manchester, England.

SPINNING MACHINE Yarn Controller and Clearer. 729,901. Gustave Schmidt, Sr., Colmar, Germany.

This invention is an apparatus for continuously operating spinning-machines for arresting thick parts of the thread or twist, which device is applicable for all thicknesses (numbers) of the thread or yarn and makes use of the well-known arrangement of guide-slots. The device, however, is new, inasmuch as the said thread-guide slots, tapering to the rear, are placed upon an adjustably-arranged



cross-plate provided alternately with elevations and depressions. On the crests of these elevations the slots are arranged so that this slotted plate, when adjusted to the required diameter of the thread, will not only arrest any sidewardly-projecting fibres, but will also break off the thread at any knots or thickness at the slots, and collect the broken thread ends which continue to be delivered in its depressions, so that these ends do not fall down upon the spindles or become tangled and spun together with the other threads or yarn.

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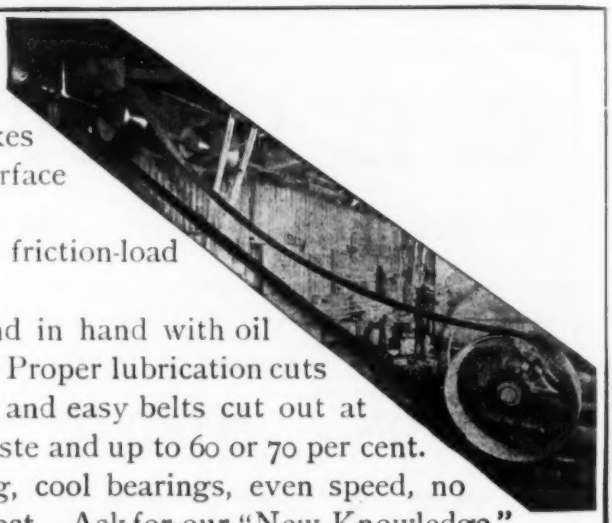

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Dyeing, Drying, Bleaching and Finishing Machinery.
American Blower Co.
American Drying Machinery Co.
American Yarn Dyeing Machine Co.
Antisdel, E. M. (Knit Dryer).
Buffalo Forge Co.
Butterworth, H. W. & Sons Co.
Curtis & Marble Machine Co.
Dubois, A. N.
Entwistle, T. C., Co.
Fabric Measuring & Packaging Co.
Fairmount Machine Co.
Gessner, David.
Heathcote, John & Son.
Hopkins Machine Works.
Howard Foundry & Mch. Wks.
Kenyon, D. R. & Son.
Klauder-Weldon Dyeing Machine Co.
Knowles, J. W. & Co.
Leyland, Thos. & Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Smith, Drum & Co.
Smith, Jas., Woolen Machinery Co.
Somerville Machine W'ks, Birch Bros. Co.
Sturtevant, B. F. Co. (Drying).
Textile Finishing Machinery Co.
Dye House Cans.
Hill, James, Mfg. Co.
Dye Sticks.
Bailey, Frank.
Haedrich, E. M.
Dyestuffs and Chemicals.
Atteaux, F. E. & Co.
Bailey-Rodgers Co.
Berlin Aniline Works.
Bischoff & Co.
Bosson & Lane.
Cassella Color Co.
Dillon & Co.
Dubois, A. N.
Farbenfabriken of Elberfeld Co.
Ford, J. B., Co.
Fortner, L. B.
Geigy Aniline & Extract Co.
Geisenheimer & Co.
Holliday & Sons, Ltd.
Johnson, Chas. A. & Co.
Kuttroff, Pickhardt & Co.
Leyland, Thos. & Co.
Metz, H. A. & Co.
Molt Bros. (Indigo Blue).
N. Y. & Boston Dyewood Co.
Roessler & Hasslacher Chemical Co.
Selling Co., The.
Sharpless Dye Wood Ext. Co.
Solvay Process Co.
Sykes & Street.
Thayer, Ed. M.
Vila, H. S.
Dynamos and Motors.
General Electric Co.
Sturtevant Co., B. F.
Edgings.
——See Tapes, Braids and Edgings.
Electrical Construction.
General Electric Co.
Electric Fans.
American Blower Co.
Buffalo Forge Co.
General Electric Co.
Mass. Fan Co.
Philadelphia Drying Machinery Co.
Sturtevant Co., B. F.
Electric Lighting.
General Electric Co.
Electric Motors.
General Electric Co.
Sturtevant Co., B. F.
Electrotyping and Printing.
Whitcomb, H. C. & Co.
Elevators.
Howard Foundry & Mch. Wks.
Jeffrey Manufacturing Co.
Morse, Williams & Co.
Salem Elevator Works.
Employers Time Recorders.
Riggs & Brothers.
Exhaust Heads.
Burt Manufacturing Co.
Pittsburg Gage & Supply Co.
Sturtevant, B. F., Co.
Fans—Exhaust and Ventilating.
——See Ventilating Apparatus.
Feed Water Heaters.
Green Fuel Economizer Co.
Scaife, W. B. & Sons.
Feed Water Pumps.
Goulds Mfg. Co.
Pittsburgh Gage & Supply Co.
Scaife, W. B. & Sons.
Feeds.
——See Automatic Feeds.
Filters.
Norwood Engineering Co.
Phila. Water Purification Co., The.
Pittsburgh Gage & Supply Co.
Scaife, W. B. & Sons.
Finishing Machinery.
——See Dyeing, Drying, Bleaching and Finishing.
Fire Brick.
Borgner, Cyrus, Co.
Fire Extinguishers.
Badger, E. B. & Sons Co.
Fire Hose.
Boston Belting Co.
Fire Hydrants.
Norwood Engineering Co.
Flax, Tow, Hemp and Jute Machinery.
Lawson, Samuel & Sons.
Fluted Rolls.
Baker Machine Co.
Riley, C. E. & Co.
Thurston, A. G. & Son.
Flyers.
Baker Machine Co.
Forges.
Buffalo Forge Co.
Sturtevant Co., B. F.
Friction Clutches.
——See Clutches.
Friction Cones.
Evans, G. Frank.
Fuel Economizers.
Green Fuel Economizer Co.
Fulling Mills for Woolen Goods.
Hopkins Machine Works.
Hunt, Rodney, Machine Co.
Hunter, Jas., Machine Co.
Kenyon, D. R. & Son.
Garnetts.
Philadelphia Textile Machinery Co.
Smith, Jas., Woolen Machinery Co.
Gaskets (Copper).
U. S. Mineral Wool Co.
Gas Engines.
Jones, Lewis.
Gas Exhausters.
Sturtevant Co., B. F.
Gaskets (Rubber).
Boston Belting Co.
Gauges.
Crosby Steam Gage & Valve Co.
Lunkenheimer Co.
Pittsburgh Gage & Supply Co.
Gears.
New Process Raw Hide Co.
Gear Cutting Machine.
Whiton, The D. E., Co.
Generating Sets.
Buffalo Forge Co.
Sturtevant Co., B. F.
Glue.
American Glue Co.
Heating.
——See Ventilating.
Heddles.
Smith, Jas., Woolen Machinery Co.
Stoddard, Haserick, Richards & Co.
Watson, L. S., Mfg. Co.
Hose.
Boston Belting Co.
Hosiery Boards.
Pearson, J. T.
Hosiery Labels.
Saranac Electrical Mfg. Co.
Humidifying Apparatus.
American Air Moistening Co.
Hydro Extractors.
American Tool & Machine Co.
Brigham, Arthur A.
Riley, C. E. & Co.
Stoddard, Haserick, Richards & Co.
Textile Finishing Machinery Co.
Injectors.
Lunkenheimer Co.
Interior Telephone System.
Stromberg-Carlson Tel. Mfg. Co.
Ironing Machines for Knit Goods.
Craw, J. W., Laundry Machinery Co.
Jacquard Cards.
Rogers Paper Mfg. Co.
Jacquards.
Halton's, Thomas, Sons.
Knit Goods, Edgings, Trimmings, Etc.
Cathcart, John & Co.
Chapin, Geo. W.
Charles, W. B.
Cheney Bros.
Friedberger Mfg. Co.
Hepner & Horwitz.
Krout & Fite Mfg. Co.
Weimar Bros.
Knit Goods Finishing Machines, Crochet, Etc.
Arnold Sewing Machine Co.
Craw, J. W., Laundry Machinery Co.
Johnson Novelty & Mill Supply Co.
Merrow Machine Co., The.
Nye & Tredick Co.
Scott & Williams.
Union Special Sewing Machine Co.
Willcox & Gibbs Sewing Machine Co.
Knitting Machine Cylinders.
Paxton & O'Neill.
Ruth Automatic Knitting Machine Co.
Stafford & Holt.
Stanton & Lewis.
Knitting Machinery.
Adams, John.
Adams Rib and Top Cutting Mch. Co.
American Knitting Machine Co.
Branson Machine Co.
Brinton, H. & Co.
Champion Machine Co.
Claes & Flentje.
Cooper, Chas.
Crane Mfg. Co.
Excelsior Knitting Machine Mfg. Co.
Hess, J. Calvin.
Jenckes, F., Mfg. Co.
Jones, Lewis.
Kennedy, Thos. (Cutters, etc.).
Keystone Knitting Machine Mfg. Co.
Lamb Knitting Mach. Mfg. Co.
Leighton Machine Co.
Lindley, Geo. W.
Ludwig, E. H.
Mayo Knitting Machine & Needle Co.
McMichael, A.
McMichael & Wildman Mfg. Co.
Mueller, Arthur.
National Automatic Knitter Co.
Nye & Tredick Co.
Paxton & O'Neill.
Pepper Machine Works.
Richter, Wolfgang.
Ruth Automatic Knitting Machine Co
Scott & Williams.

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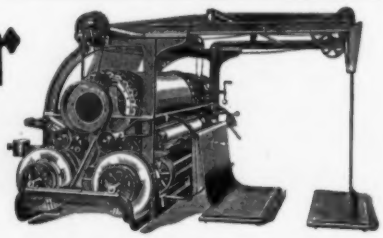

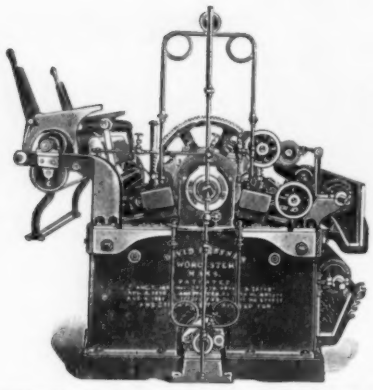

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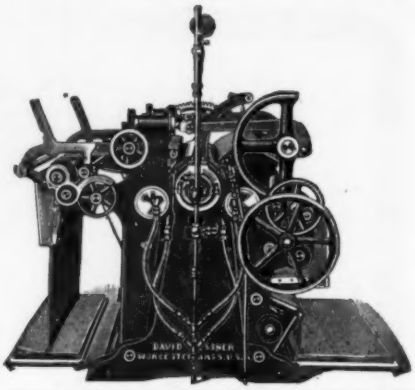
Napping Machines and Presses a Specialty



Knitting Machinery—cont.

Seyfert & Donner.
Stafford & Holt.
Standard Machine Co.
Taylor, James.
Tompkins Bros.
Walther, Otto.
Wildt & Co.

Knitting Needles and Supplies.
Breedon's, Wm., Son.
Brinton, H. & Co.
Cooper, Chas.
Corey, Wm., Co.
Crane Mfg. Co.
Dodge Needle Co.
Ives, Loyal T.
Keystone Knitting Machine Mfg. Co.
Lamb Knitting Machine Mfg. Co.
Manufacturers' Supplies Co.
Mayo Knitting Machine & Needle Co.
Page Needle Co.
Ruth Automatic Knitting Machine Co.
Treat, Orion.
Wardwell Needle Co.

Knotter for Spoolers.
Barber & Colman.

Labeling Machine.
F. & G. Novelty Co.
Saranac Electrical Mfg. Co.

Laboratory Outfits.
Feidt, Geo. D. & Co.

Leather.
Houghton, E. F. & Co.

Leather Boards.
Rogers Paper Mfg. Co., Inc.

Lockers.
Narragansett Machine Co.

Looms.
Asala Co.
Crompton & Knowles Loom Works.
Draper Company.
Fairmount Machine Works.
Howard Fndy. & Mch. Wks. (For Wire).
Kilburn, Lincoln & Co.
Leigh, Evan A.
Lowell Machine Shop.
Mason Machine Works.
Smith, Jas., Woolen Machinery Co.
Stafford, George W, Co., The.
Stoddard, Haserick, Richards & Co.
Whitin Machine Works.

Loopers.
Beattie's Machine Works.
Hepworth, John W. & Co.
Leighton Machine Co.

Lubricators.
Dixon, Jos., Crucible Co.
Lunkenheimer Co.
Pittsburgh Gage & Supply Co.

Lumber.
Stearns, A. T., Lumber Co.

Lumpers.
Gerry, George & Son.

Machinery Dealers.
American Textile Supply Co.
Jefferson, Ed. & Bro.
Pittsburgh Gage & Supply Co.
Schofield, Geo. L.
Taylor, James.

Machinists' Tools.
Dodge Mfg. Co.
Whiton, The D. E. Co.

Mails.
Walder, J.

Measuring and Folding Machines.
Curtis & Marble Machine Co.
Elliott & Hall.
Fabric Measuring & Packaging Co.

Mechanical Draft.
American Blower Co.
Boston Blower Co.
Buffalo Forge Co.
Mass. Fan Co.
Sturtevant, B. F., Co.

Mechanical Engineers.
American Blower Co.
Buffalo Forge Co
Sturtevant Co., B. F.
Suck, Adolph.

Mercantile Agency.
Dun, R. G. & Co.

Mercerizers.
Blissville Mills.
Cooper Mercerizing Co.

Mercerizing Machinery.
Butterworth, H. W. & Sons.
Klauder-Weldon Dyeing Machine Co.
Smith,' Drum & Co.
Textile Finishing Machinery Co.

Mill Architects.
See Architects & Mill Engineers.

Mill Brushes.
See Brushes.

Mill Builders and Engineers.
Ferguson, John W.

Mill Sewing Machines.
—*See* Sewing Machines and Supplies.

Mill Supplies.
American Supply Co.
American Textile Supply Co.
Bamford & Smith.
Bristol, The, Co.
Buckley's, Benj. Son, Gun Mill.
Chase Pulley Co.
Crosby Steam Gage and Valve Co.
Dixon Lubricating Saddle Co.
Dodge Mfg. Co.
Easton-Burnham Co.
Jefferson, Ed. & Bro.
Jeffrey Manufacturing Co.
Johnson Novelty & Mill Supply Co.
Keystone Leather Belting Works.
Lane, W. T. & Bro.
Main Belting Co.
Morris & Co.
Pittsburgh Gage & Supply Co.
Putnam & Co.
Riley, C. E. & Co.
Shaw, Victor, Ring Traveler Co.
Smith, Jas., Woolen Machinery Co.
Stephenson Mfg. Co.
Stoddard, Haserick, Richards & Co.
Sweet & Doyle.
Thurston, A. G. & Son.
Ward & Vandegrift.
Walworth Manufacturing Co.
Watson, L. S., Mfg. Co.

Napping Machinery.
American Napping Machine Co.
Borchers, Richard C. & Co.
Columbia Napping Machine Co.
Curtis & Marble Machine Co.
Gessner, David.
Jones, Lewis.
Parks & Woolsen Machinery Co.
Woonsocket Napping Machinery Co.

Noils (Silk).
Malcolm Mills Co.
Ryle, Wm. & Co.

Oil Cups.
Lunkenheimer Co.
Pittsburgh Gage & Supply Co.

Oil Filters.
Burt Manufacturing Co.
Pittsburgh Gage & Supply Co.

Oils.
Stephenson Mfg. Co.

Oilless Bearings.
Arguto Oilless Bearing Co.

Overhead Trolley Track.
Putnam & Co

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Arnold Sewing Machine Co.
Champion Machine Co.

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Willcox & Gibbs Sewing Machine Co.

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Dubois, A. N.

Packing.
Boston Belting Co.

Paint.
Patton Paint Co.
Standard Paint Co.

Painting Machines.
Patton Paint Co.

Pantagraphs for Mill Engraving.
Johnson, C. A., & Co.

Paper Box Machinery.
Langston, Samuel M.

Paper Tubes.
Sayford Paper Specialty Co.

Patent Solicitors.
Crosby & Gregory.
Howson & Howson.
Jacker, R. J.
Siggers & Siggers.
Straley, Hasbrouck & Schloeder.

Perforated Metals.
Beckley, A. J. & Co.

Peroxide of Sodium.
Roessler & Hasslacher Chemical Co.

Pipes and Fittings.
Pancoast, Henry B. & Co.
Walworth Manufacturing Co.

Pneumatic Conveying.
—See Ventilating.

Power Transmission Machinery.
Allis-Chalmers Co.
American Drying Machinery Co.
Chase Pulley Co.
Dodge Mfg. Co.
Evans, G. Frank.
Fairmount Machine Works.
Howard Foundry & Mch. Wks.
Hunter, Jas., Machine Co.
Jeffrey Manufacturing Co.
Kilburn, Lincoln & Co.
Oneida Steel Pulley Co.
Pittsburgh Gage & Supply Co.
Philadelphia Drying Machinery Co.
Saginaw Manufacturing Co.
Sellers, William & Co.
Smith, Jas., Woolen Machinery Co.
Textile Finishing Machinery Co.

Preparatory Machinery (Cotton).
Atherton, A. T., Mach. Co.
Howard & Bullough Am. Machine Co.
Kitson Machine Co.
Riley, C. E. & Co.
Saco & Pettee Machine Shops.
Smith, Jas., Woolen Machinery Co.

Press Boards and Fenders.
Rogers Paper Mfg. Co., Inc.

Pressers.
Baker Machine Co.

Presses.
Boomer & Boschert Press Co.
Butterworth, H. W. & Sons Co.
Curtis & Marble Machine Co.
Gessner, David.
Hart, Charles.
Howard Foundry & Mch. Wks.
Spence & Rideout.
Textile Finishing Machinery Co.
Woonsocket Machine & Press Co.

Pulleys.
—See Power Transmitting Machinery.

Pumps.
Allis-Chalmers Co.
Goulds Mfg. Co.
Textile Finishing Machinery Co.

Purifying & Filtration Plants.
Scaife, W. B. & Sons.

Rag Pickers.
Smith, Jas., Woolen Machinery Co.

Ramie Tops and Noils.
Tierney, Frank A.

Raw Hide Gears.
New Process Raw Hide Co.

Reed and Harness Manufacturers.
American Supply Co.
Walker, J.

Reels.
Luther, C. A. & Co.

Remnants.
Feingold, H. & D.

Ribbons.
Cheney Bros.

Ring Travelers.
National Ring Traveler Co.
Shaw, Victor, Ring Traveler Co.

Roofing.
Standard Paint Co.

Rope and Twine Machinery.
Haskell-Dawes Machine Co., The

Rope Transmissions.
Dodge Mfg. Co.

Roving Cans.
Hill, James, Mfg. Co.
Laminar Fibre Co.
N. E. Ventilating & Heating Co.
Walrus Fibre Mfg. Co.

Rubber Covered Rollers and Goods.
Boston Belting Co.

Rubberoid Roofing.
Standard Paint Co.

Saddles and Stirrups.
Dixon Lubricating Saddle Co.

Scales.
Sweet & Doyle.

Scallop Machines.
Merrow Machine Co.

Schools.
Lowell Textile School.
New Bedford Textile School.
Philadelphia Textile School.

Secondhand Machinery.
—See Mchry. Dealers also classified ads.

Screens (Perforated).
—See under Perforated Metal.

Selling Agents.
—See Commission Merchants.

Separators.
Draper Co., The.

Sewing Machines and Supplies.
American Overstitch Machine Co.
Arnold Sewing Machine Co.
Champion Machine Co.
Curtis & Marble Machine Co.
Dinsmore Mfg. Co.
Fales, L. F.
Manufacturers' Supplies Co.
Somerville Machine W'ks, Birch Bros. Co.
Textile Finishing Machinery Co.

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Willcox & Gibbs S. M. Co.

Shafting, Hangers, Etc.
——See Power Transmission Machinery.

Shearing Machinery.
——See Dyeing, Drying, Bleaching and Finishing.

Sheet Metal Work.
Barney Ventilating Fan Works.

Shell Rolls.
Thurston, A. G. & Son.

Shoddies.
——See Wool Shoddies.

Shuttle Cheeks.
Victor Shuttle Check Co.

Shuttles.
——See Bobbins, Spools, Shuttles, Etc.

Silk Machinery.
Butterworth, H. W., Sons Co.
Mason Machine Works.
Stoddard, Haserick, Richards & Co.
Textile Finishing Machinery Co.

Silk Mill Supplies.
Hall, I. A. & Co.

Singe Plates.
Butterworth, H. W., Sons Co.
Taunton, New Bedford Copper Co.

Singeing Machines.
Butterworth, H. W., Sons Co.
Curtis & Marble Machine Co.
Knapp, Charles H.
Somerville Machine W'ks, Birch Bros. Co.
Smith Drum & Co.
Textile Finishing Machinery Co.

Sizing, Starch and Gums.
Arabol Mfg. Co.
Elwell, Henry A. & Co.
O. K. Soap Co.
Stein, Hirsch & Co.

Skylights.
Drouve, G., Co.

Slashers.
Lowell Machine Shop.
Riley, C. E. & Co.

Smokestacks.
Allen, Wm. & Sons Co.

Soaps.
American Soap & Washoline Co.
India Alkali Works.
O. K. Soap Co.
Rome Soap Mfg. Co.

Spindles.
Bamford & Smith.
Buckley, Benjamin, Sons, Gun Mill.
Draper Company.
Easton-Burnham Co.
Riley, C. E. & Co.
Stoddard, Haserick, Richards & Co.
Ward & Vandegrift.
Whitin Machine Works.

Spindle Tubes.
Bamford & Smith.
Riley, C. E. & Co.
Stoddard, Haserick, Richards & Co.

Spinning Cylinders.
N. E. Ventilating & Heating Co.

Spinning Frames.
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Spinning Rings.
Draper Company.
Whitinsville Spinning Ring Co.

Spinning Tubes.
Buckley, Benjamin, Sons, Gun Mill.

Spools.
——See Bobbins, Spools, Shuttles, Etc.

Spooler Knotter.
Barber & Colman.

Spoolers.
Easton & Burnham Machine Co.
Lindsay, Hyde & Co.
Payne, George W. & Co.

Stamps for Hosiery.
Atlas Copper Stamp Works.
Wells, Wilfred.

Steam Boilers.
Allen, Wm. & Sons Co.

Steam Boiler Insurance.
Hartford Steam Boiler Inspection & Insurance Co.

Steam Boxes.
Allen, Wm. & Sons Co.

Steam Engines.
Allis-Chalmers Co.
American Blower Co.
Atlas Engine Works.
Buffalo Forge Co
Fishkill Landing Machine Co.
Harrisburg Foundry & Machine Co.
Hooven (The), Owens & Rentschler Co.
Sturtevant, B. F. & Co.
Textile Finishing Machinery Co.

Steam Jacket Kettles.
Badger, F. B. & Sons Co.

Steam Pumps.
Goulds Manufacturing Co., The.

Steam Specialties.
Butterworth, H. W., Sons Co.
Crosby Steam Gage and Valve Co.
Lunkenheimer Co.
Mason Regulator Co.
Pittsburgh Gage & Supply Co.
Sturtevant Co., B. F.
Textile Finishing Machinery Co.
Walworth Manufacturing Co.

Steam Traps.
Albany Steam Trap Co.
Lunkenheimer Co.

Stop Motion for Looms.
——See Warp Stop Motions.

Tanks, Tubs and Vats.
Caldwell, W. E. Co.
Cypress Lumber Co.
Hall, Amos H. Son & Co.
Lewis, H. F. & Co.
Stevens, D. B. & Co.
Textile Finishing Machinery Co.
Woolford, George, Tank Mfg. Co.

Tapes, Braids and Edgings.
Cathcart, John & Co.
Chapin, George W.
Friedberger Mfg. Co.
Krout & Fite Mfg. Co.
Weimar Bros.

Telephones.
Stromberg-Carlson Tel. Mfg. Co.

Temples.
Draper Co.

Tension Pulleys.
N. E. Ventilating & Heating Co.

Tentering Machines.
——See Dyeing, Bleaching Machinery, Etc.

Tenter Clips.
——See Dyeing, Drying, Bleaching and Finishing Machinery.

Testing Machines.
Howard Foundry & Machine Works.

Textile Schools.
——See Schools.

Thread Board for Spinning & Twisting Frames.
Houghton, L. T.

Thread Dressers or Polishers.
Luther, C. A. & Co.

Ticketing Machinery.
See Labeling Machines.

Tower Clocks.
Howard, E., Clock Co.

Turbine Governors.
Replogle Governor Works.

Turbines.
——See Water Wheels.

Twine Machinery.
Brownell, G. L.
Haskell-Dawes Machine Co.

Twisting Machinery.
Brownell, G. L.

Valves.
Boston Belting Co.
Lunkenheimer Co.

Ventilating Apparatus.
Allington & Curtis Mfg Co.
American Air Moistening Co.
American Blower Co.
American Drying Machinery Co.
Barney Ventilating Fan Works.
Berry, A. Hun.
Boston Blower Co.
Buffalo Forge Co.
Drouve Co., G.
Massachusetts Fan Co.
New England Ventilating & Heating Co.
Nichols, E. M.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Sargent's, C. G., Sons.
Smith, Jas., Woolen Machinery Co.
Sturtevant, B. F., Co.

Warping and Beaming Machinery.
Draper Co.
Entwistle, T. C., Co.
Fairmount Machine Co.

Warp Stop Motions.
Draper Co.
Stafford, George W. Co., The.

Washers (Cloth).
Birch Bros. Co.
Butterworth, H. W. & Sons Co.
Hunt, Rodney, Machine Co.
Hunter, Jas., Machine Co.
Kenyon, D. R. & Son.
Somerville Machine W'ks, Birch Bros. Co.

Washing Soda.
Ford, J. B., Co.

Watchman's Clocks.
Howard, E., Clock Co.
Inhauser, E. & Co.
Nanz & Co.
Riggs & Brothers.

Water Purifiers & Filters.
Scaife, W. B. & Sons.

Water Towers.
Caldwell, W. E., Co.

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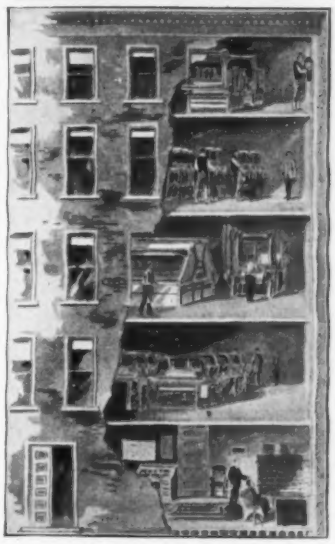
Interior Telephones



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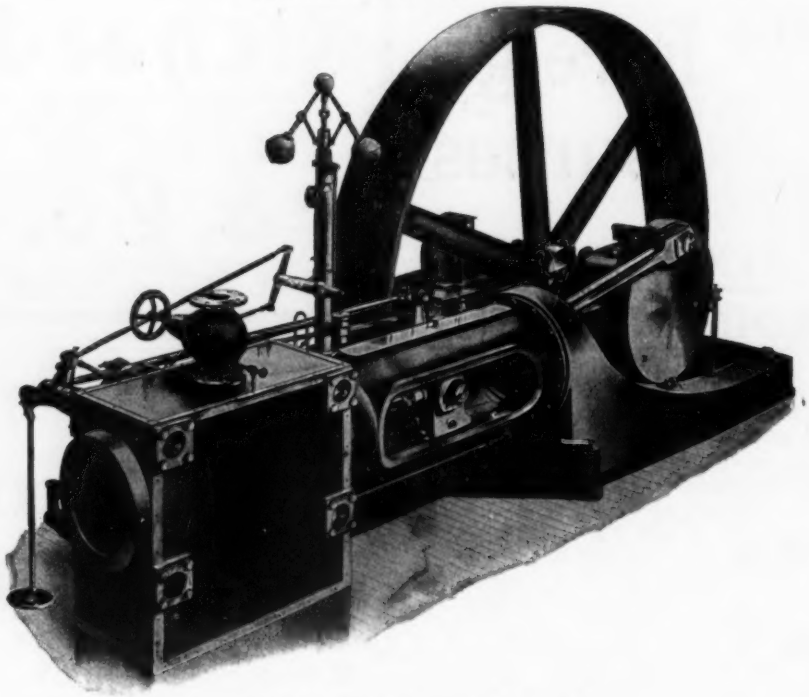

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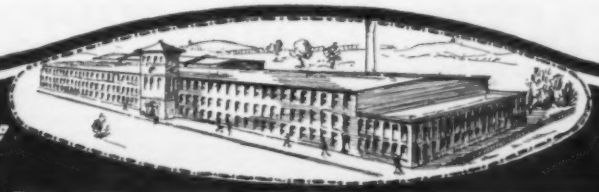

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Superintendent. Worked on ginghams and cotton warps of all kinds. Lowell, Whitin and Draper machinery. Age 41; American. Good experience. 2095, Textile World Record.

Superintendent and Designer. Has had 18 years' experience in weaving room, 12 years being in charge of rooms in some of the best mills in New England on fine yarns and fancies and designing. Qualified for superintendent's place. 2098, Textile World Record.

Cotton Mill Superintendent, or assistant. Age 34; married. Worked on cotton machinery on coarse and medium numbers. Textile school education in designing, carding and spinning. 3003, Textile World Record.

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Superintendent and Carder of Cotton. Has handled all classes of goods 35 years; American, married. Best of references. 1872, Textile World Record.

General Manager and Superintendent of cotton mill desires position; 37 years old; single; English. 18 years' experience on yarns, flannelettes, denims, grays, and shirtings. Good references. 1896, Textile World Record.

Superintendent cotton spinning mill is open to position. Age 32; German; married. Is familiar with all kinds of cotton goods. Excellent references. 2074, Textile World Record.

Superintendent, or overseer of carding. Worked on combed and carded yarn from 20 up to 140, twilled sateens, lawns, sheetings and shirtings. English and American machinery. 3036, Textile World Record.

Supt. of Cotton Mill, or overseer of mule or ring spinning is open to a position; 16 years' experience in Northern mills, on yarns, denims, awnings, apron checks, bicycle suitings, shirtings, etc., etc. Familiar with all well-known makes of cotton machinery; 29 years old: American; married. Can give references from large Massachusetts mills. 1527, Textile World Record.

Superintendent or Manager of large hosiery yarn mill will be open to a position shortly. American; married. Has manufactured in the South hosiery yarns in natural stats, mixtures, silver grays, bleached and colored. Can refer to influential men. 1961, Textile World Record.

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Superintendent, woolen or worsted. Been overseer of weaving and superintendent in New England mills. Age 44, married; American. 1785, Textile World Record.

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Assistant Superintendent or Designer, woolen or worsted, who understands designing and also the work of every department. Has worked on fine worsteds, coverts, cheviots, kerseys, meltons and fancy cassimeres. Technical education acquired at Philadelphia Textile School. Six years' practical experience, three as designer. Age 24; American; good references. Will go anywhere. 1974, Textile World Record.

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Woolen Superintendent. Worked on nearly all kinds of men's wear and dress goods. Good experience as overseer and superintendent. Aged 51; American; married. 813, Textile World Record.

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Superintendent of Woolen or Worsted Mill, who understands designing, is open to a position. 23 years of age; an American; single. Well recommended, and with good experience. 1891, Textile World Record.

COTTON CARDERS.

Carder in Cotton Mill. Coarse or fine, white or colored, hosiery, Egyptian, etc. Age 35; Canadian; married. 3029, Textile World Record.

Overseer of Carding. Large experience on all kinds of work and both English and American systems. Can furnish first-class references. Had charge of carding in some of the best New England mills. 3009, Textile World Record.

Overseer of Carding. Age 39; married. Worked on coarse and fine numbers and combers. American and English machinery. 3012, Textile World Record.

Overseer of Carding or cotton ring spinning. Worked on carded and combed Peelers, Egyptian, and Sea Island cottons, making yarns from 8 to 80. 3015, Textile World Record.

Overseer Cotton Carding or Spinning desires position. Age 47; American; married. Is familiar with all the modern makes of English and American machinery, revolving top flat cards, single and double carding. 2073, Textile World Record.

Boss Carder. Aged 28. Worked on plain goods. Will go South or anywhere. Steady man, and excellent references. Also a frame spinner. 1759, Textile World Record.

Boss Carder or Ring Spinner and Combing. Cotton hosiery yarns. Will go anywhere. Excellent recommendation. 2025, Textile World Record.

Overseer or Second Hand of Cotton Carding. Age 33: German; married. Hosiery yarns, sheetings, prints, all grades of cotton from waste to Egyptian cotton from 80 to 1600 hank. Not at present employed. Good experience and references. 3026, Textile World Record.

WOOLEN CARDERS.

Overseer of Woolen Carding, age 32; American; married. Good experience and excellent references. Worked in kerseys, meltons, cheviots, cassimeres, coverts, dress goods, broadcloths, etc. 2060, Textile World Record.

Overseer for Washing, Carding or Combing wool for worsted wants to better himself. Speaks German, French and English. Best of references. 2083, Textile World Record.

Overseer Burling and sewing, or cloth examiner in commission house. Familiar with cassimeres, chinchillas, dress goods, serges, cotton worsteds and all worsted goods. 1866, Textile World Record.

Overseer of Carding and Spinning. Middle aged; English; married. Dress goods, flannels, blankets, overcoatings and plush goods. English and American makes of machinery, also an expert on the Bollette condenser. 2079, Textile World Record.

Boss Carder. Cotton, woolen, worsted and silk mixes of all kinds. Can take place at once, and wants not less than $3 per day. Age 48; American; married. Excellent references and experience. 2055, Textile World Record.

Overseer of Woolen Carding. Age 26; American. Familiar with all American cards. Worked on cotton, wool, shoddy, noils and mixes. Strictly temperate. Will not go West or South. Refers to past employers. 3023, Textile World Record.

Secondhand Carder familiar with all wool, wool and cotton and shoddy mixes on Davis & Furber and Furbush cards would like to obtain a position. 21 years old, American. Good references. 2000, Textile World Record.

COTTON WEAVERS.

Woolen Boss Weaver. Steady, reliable and an excellent man in a weave room. Has worked on almost all kinds of woolen goods, and is familiar with Crompton & Knowles looms. Will accept position for not less than $2.50 per day. 2088, Textile World Record.

Boss Weaver or Designer, or could fill a position as all around man in a small mill. Age 42; Scotch; married. Worked on fancy cashmeres, blankets, flannels, carriage robes, and other fancy goods. Is familiar with Crompton & Knowles, Davis & Furber, and other looms. Wants to go West or South. 1940, Textile World Record.

Boss Weaver wants position. Very wide experience. White and colored, plain and fancy. Understands all kinds of looms. 335, Textile World Record.

Overseer of Weaving or designer. Age 29; American; married. Thibets, meltons, kerseys, worsteds and cotton worsteds. Crompton & Knowles looms. Good experience. First class recommendation. 2051, Textile World Record.

Boss Weaver or assistant designer. Wants position with a firm who is willing to advance a man as he proves himself worthy. 28 years old; married, and a steady worker. For past six years worked in all parts of the weave room and pattern room, pattern weaving and dressing, chain building, harness raising, perching, fixing and regular weaving. Now taking course of study in woolen and worsted designing. Excellent reference. 2019, Textile World Record.

Overseer of Weaving, or would take good second hand job. Age 42; married. Worked on dress goods, suitings, plaid backs, cloakings, meltons and other classes of goods. Worked on Crompton & Knowles loom. 3016, Textile World Record.

WOOLEN WEAVERS.

Overseer of Cotton Weaving. Sheetings, sateens and all kinds of fancies from 2 to 24 harness, lenos, lappets and jacquard. Age 32; English and married. 1934, Textile World Record.

Overseer of Cotton Weaving. Age 34; American; married Fine lawns, sateens, corduroys, crochet goods and all kinds of fancies and lenos. Can take position at once. 2087, Textile World Record.

Boss Weaver, who is familiar with cotton, woolen and worsted looms and all classes of goods, is open to a position in a large mill. 46 years of age; American; married. Strictly temperate and is recommended by some very large N. E. woolen and cotton mills 1959, Textile World Record.

Overseer of Weaving in cotton mill. Worked on lawns, dimities, sheetings, corduroys, velveteens, etc. Colvin, Mason, Whitin, Kilburn & Lincoln, Knowles and Draper looms. 3011, Textile World Record.

Practical Boss Weaver and loom fixer wants position. Good and long experience. Good record for big production; good quality and for being a good manager of help, and the getting and keeping plenty of good hands. A sober and steady man. Will go anywhere. Either cotton, woolen or jute. 1806, Textile World Record.

Overseer of Weaving. Age 35; Scotch; married. Good experience, and excellent references, Crompton, Whitin, Lowell, Colvin, Woonsocket and English looms. Sheetings, lawns, ginghams, flannels, fine worsteds, dress goods, shirtings and novelty goods. 2016, Textile World Record.

COTTON SPINNERS.

Overseer of Mule Spinning who has had a wide experience in large New England mills on yarns ranging from 24's to 160's is open to a position. 37 years old; American. Good references. 2003, Textile World Record.

Cotton Mule Spinner. Age 42; French; married. Has worked on prints and sheetings and on yarns from 9's to 50's. First class references. Two years' experience as secondhand and five as overseer. Wants $2.50 per day to start with. 1690, Textile World Record.

Secondhand Spinner. Held positions of charge of cone and tube winding and spooling, also section of spinning frames. Cotton yarns 8's to 100's on twisters, spoolers, winders, warpers. 3030, Textile World Record.

Second Hand on Mules. Has had 20 years' experience on cotton mule spinning as mule fixer and second hand. Age 39, with family. Good references. 1950, Textile World Record.

Boss Ring or Mule Spinner. Age 43; English; married. Asa Lee mules, Lowell Machine Shop, Platt, Mason mules; Howard & Bullough, Lowell and Mason frames. Yarns from 5's to 90's. 3001, Textile World Record.

Overseer of Cotton Mule Spinning. Understands Mason and English makes of mules. Has worked in mule room sixteen years, five years as second hand and a year and a half as overseer. 28 years old; married; steady and temperate. Would like to get work in N. E. or New York states. Has worked on colored hosiery yarn and filling. 1822, Textile World Record.

Overseer of Ring Spinning. Aged 42; American; married. Ginghams, sheetings, awnings, denims, etc.; $3 to $4 per day. 3018, Textile World Record.

Overseer Ring Spinning, Warping and Spooling. Is experienced on white work from Nos. 4's to 30's. Is familiar with Whitin and Lowell Machine Shop spinning frames and spoolers and warpers. Wants $3 per day to start with. Age 39; American; married. 1703. Textile World Record.

WOOLEN SPINNERS.

Overseer of woolen spinning desires to make a change. Is familiar with suiting, union, cassimere, satinet and knitting yarns and all ordinary makes of machinery. 30 years of age; American; married. Good references as to character and ability. 1987, Textile World Record.

Overseer Woolen Spinning. Is thoroughly competent to take charge of a large spinning room. 38 years old; French; married. Has spun yarns for flannels, tweeds and knit goods, also cotton and wool mixes, shoddies, ranging in all from 1/2 to 14 runs. Is familiar with Davis & Furber, Johnson & Bassett, Platt and other makes. Very satisfactory references. 1917, Textile World Record.

Worsted Spinner or Section Hand. Age 22 and unmarried. At present employed, but not satisfied with surroundings. Would accept moderate pay. 1709, Textile World Record.

Overseer of Ring or Frame Spinning, or would take superintendent position. Age 41; married. 2040, Textile World Record.

Overseer of woolen spinning desires to make a change. Is familiar with suiting, union, cassimere, satinet and knitting yarns and all ordinary makes of machinery. 30 years of age; American; married. Good references as to character and ability. 1987, Textile World Record.

Boss Spinner. Age 34; Scotch. Worked on all wool, cotton and wool and shoddy mixes. Will not go West, South or to Canada. References. Good experience. 3032, Textile World Record.

DYERS.

Dyer. Second-hand in large house, or boss dyer in small reliable woolen mill. Would accept good offer as chemist to some mill. Age 25; American. Textile graduate, and has held various positions in the laboratory and with dyestuff dealers during past three years. 2097, Textile World Record.

Dyer, Scourer and Bleacher in knitting mill Age 39; married. All grades of underwear spring and latch needles. First-class recommendations. Will not go West or to Canada. 3004 Textile World Record.

Dyer on cotton and woolen piece goods, yarn and fast black on cotton. Age 42; married. 3021, Textile World Record.

Overseer of Dyeing and Bleaching. Age 33; Scotch, married. Denims, awnings, ticking, outing flannel and madras. First-class references. 3022, Textile World Record.

Boss Dyer and Bleacher. Age 34; English; married. Yarns, warps, knit goods. Can give good references. Wants $4 or more. 3020, Textile World Record.

Expert Hosiery Dyer. Age 27; married and sober. Desires position of superintendent of dyeing in a first-class hosiery mill, one manufacturing high grade goods preferred. Has had over seven years' practical experience in dyeing one of the best aniline blacks on cotton, also fast colors on cotton, wool, silk and union hosiery. Best of references furnished. 2052, Textile World Record.

Cotton Dyer, bleacher or chemist. Age 39. Drills, ducks, sateens, brocades, cotton trowserings, cambric handkerchiefs, sheetings, etc., also printing. Large experience on all classes of cotton goods. 1966, Textile World Record.

FINISHERS.

Finisher of Cotton Goods, also worsteds, by calender, hot press and beetle, also understands frames, starching and mercerizing. Age 25; English. 3006, Textile World Record.

Finisher, both wet and dry. Age 28; English; married. Shirtings, ginghams, cotton dress goods, mercerized effects and men's cotton suitings and trouserings. Excellent references. 3007, Textile World Record.

Cotton Finisher. Age 27. Worked on prints, lawns, dimities, muslins, ducks, drills, Madras, etc. Understands folding and packing. 3005, Textile World Record.

Overseer of Finishing, worsted goods, white or fancy. A young man; married; English. Has had full charge of piece dye finishing. 3019, Textile World Record.

Overseer of Finishing. Prefers a satinet mill. Eight years' experience as overseer. Aged 47. 3017, Textile World Record.

Overseer of Warping, Spooling and Winding. Dress goods and cloth. Will not go to Canada. Aged 40; married. Good experience. References. 3027, Textile World Record.

Boss Finisher. Would take good secondhand or wet finishing job. Age 41; English. All kinds of woolen and worsted goods, both steam and dry finish. Willing to go anywhere. Both English and American makes of machinery. Excellent references. 2061, Textile World Record.

Overseer of Finishing. Age 32; American. Woolen and worsteds, suitings, coatings, cloakings, cassimeres, cheviots, meltons, frieze, etc. 2070, Textile World Record.

KNITTERS.

Foreman Latch Needle knitter, or fixer with good chance of promotion. Men's and women's underwear, cotton, worsted and silk. Worked on Scott & Williams, McMichael & Wildman, Stafford & Holt, Snyder & Fisher and the Fisher fleece machines. Recommendations. 3000, Textile World Record.

Foreman Knitter in underwear mill. Age 30; American. Familiar with Campbell & Clute, Tompkins, Scott & Williams and Cooper machines. 3038, Textile World Record.

Knitter. Worked on light and heavy weight ladies' ribbed vests and shaped vests, and all kinds of common knit goods. Familiar with Champion, Nye & Tredick, Star, McMichael & Wildman machines. Wants work in Pennsylvania or Western States. 3037, Textile World Record.

Boss Knitter. finisher or machinist. Worked on nearly all kinds of knit goods, and nearly all kinds of latch needle knitting machines and all kinds of machines used in finishing underwear. 889, Textile World Record.

Overseer Boarding and finishing hosiery. All kinds of men's, women's and children's hosiery, except silk. Age 41; American; married. Can furnish references. 3035, Textile World Record.

Superintendent Hosiery Mill. Age 22; American; single. Worked on 84 needle goods. Prefers position in the South. 3033, Textile World Record.

Manager or assistant superintendent, lace making or seamless hosiery. Would like to invest in Southern mill. A young man; English; married. 2066, Textile World Record.

Machinist on Leighton circular machines. Worked on sweaters and jacket. 2026, Textile World Record.

Superintendent knitting mill. Cotton and wool hosiery, heavy mittens, sweaters, toques. Good experience. Aged 45; married. 1291, Textile World Record.

Overseer of Knitting. Ladies' and infants' underwear. Good experience. 1777, Textile World Record.

Overseer of Carding and Spinning. Worked on dress goods, flannels, blankets, overcoatings, plush goods. Good and long experience. Wants position at once. Steady man. 2079, Textile World Record.

Asst. Superintendent or Boss Knitter. Age 29, strictly temperate and held position of boss knitter for past four years running. Fleeces, balbriggan and flat work on spring needles, and plaited, straight and shaped work on several makes of latch needles. Can give best of references. 1492, Textile World Record

Overseer on Spring Needle circular knitting machines wants position. An ingenious, energetic and progressive man, who has spent his life in one of the largest and best equipped knitting mills in country. Particularly good on fine jerseys, stockinets, fleeces, eiderdowns, rubber linings, dress shields, blankets, slipper cloth, etc. 2094, Textile World Record.

Foreman of Knitting Room, spring needle or flat knitting. Age 28. Fleeces of all kinds and gauges, balbriggan from 20 to 30 gauge, flat wool work all gauges. Is familiar with Tompkins Bros., Campbell & Clute and Crane machines. 2062, Textile World Record.

Cuff Knitter and Fixer. Wants a place where he will have steady work. 1951, Textile World Record.

MISCELLANEOUS.

Loom Fixer. Age 27. Knowles and Crompton looms. Wants not less than $2.25 per day. Will not go West or to Southern States. 3014, Textile World Record.

Overseer of Spooling, warping, beaming, slashing and web drawing. Age 37; married. 3010, Textile World Record.

Spare Hand Loom Fixer. Wants place where he can settle down. Is familiar with Crompton & Knowles looms. Age 40. 2091, Textile World Record.

Master Mechanic in cotton mill. Wants $1,500 to $2,500 per year, according to duties and position. Can take place at once. Will not go to Western States or Canada. Familiar with steam engines, pumps, boilers, water wheels and complete cotton mill equipment. 3039, Textile World Record.

Colorist and color mixer for all kinds of printing. Also understands plush printing and extract work. 10 years' experience. Can give references. 2045, Textile World Record.

Master Mechanic wishes position in the North. 35 years old; married. Worked 15 years on repairs. Wants $3.50 per day. Has license for running engines and boilers Understands all kinds of water wheels and care of same, dynamos and electric lights and also gas houses, and a good knowledge of building, all kinds of wood work and piping and blacksmithing. Understands cotton mill repairs as good as the best man at such work. 2025, Textile World Record.

An Expert on soap making and wool scouring will be open to a position shortly. Is familiar with the treatment of all grades. About 40 years old; English; married. Has worked for one concern in the United States for 12 years. 1980, Textile World Record.

DESIGNERS.

Designer in small mill or assistant in large mill. Age 22; Scotch; single. Has worked on fancy cassimeres, plaid backs, coverts, unions, worsted trouserings and shirtings. Fair knowledge of Jacquard designing. Johnson & Bassett mules, Davis & Furber dresser, and Knowles looms. Is willing to work for moderate salary, with chance of promotion. 1837, Textile World Record.

Smart Designer, high class worsteds and coatings and trouserings. Thorough experience leading factory. Now abroad; anxious to find employment in this country. Moderate start. 1816, Textile World Record.

Assistant Designer on woolen or worsted dress goods and suitings is open to a position. Age 21; American; single. A graduate of one of the largest textile schools in the country, and has had experience in a good New England mill. Also understands flannels and satinets. Good references. 1923, Textile World Record.

Designer or Assistant Superintendent desires a position. 27 years old; Scotch; married. Familiar with all well known makes of machinery and with woolen, worsted and cotton goods. Good references. Will go to any part of the United States. Terms reasonable. 1996, Textile World Record.

A Young Man, 23 years of age, English, would like a position as assistant designer or boss weaver. Has worked on woolen dress goods, cloakings, suitings and worsted suitings. Good references. Moderate wages. Three weavers in family. 1997, Textile World Record.

Designer, or assistant designer. Unions, flannels, tweeds, beavers, serges and worsteds. Age 28; English; married. Can furnish first-class references. 3031, Textile World Record.

Perfect Fast Black for Hosiery

The "Dubois' Sanitary" Oxidized Fast Black Dyeing Process with the Lisle Thread Silk Finish, Patented March 17, 1903, and The "Dubois Sanitary" One Dip Fast Black in Powder Form, Leads Them All!

This is the most reliable dyeing formula known to fast black dyers. It has been adopted successfully by many leading mills. It always gives uniform shade, oxidizes well and the fabric is almost as strong as though dyed with direct colors. Most important of all, it gives a fine lisle thread finish without in the least tendering the goods. Beware of cheap fast black formulas, which are sure to be dearer in the end.

The cost of the Dubois black, the best in the market, is very reasonable, as low as $1.40 per 100 pounds dyed in ordinary black for cheap trade, and not over $2.50 per 100 for the very best black for high grade goods, guaranteed to be ungreenable to acid tests and wear. Manufacturers of knit goods, hosiery and job dyers ***take notice*** that I am prepared to give licenses with full instructions for producing lisle thread finish (processes patented March, 1903) on any kind of direct colors or fast black, either before or after dyeing or bleaching.

Sulphur and diamine blacks particularly are so much improved after having been lisled by my patented process that they look just as well as aniline oxidized fast black, and yarn costing 17 1-2 cents per pound will produce as fine a looking fabric treated by my process as the genuine lisle thread at a cost of 34 cents per pound. This is a boon for direct color job dyers and bleachers, as well as for manufacturers of hosiery and knit goods.

The license will be given on a small royalty per 100 pounds.

All the machines used for the fast black and lisle thread finish, also for giving lisle thread finish to direct colors on bleached or unbleached goods are of my own invention, and are

PATENTED AS FOLLOWS:

June 18, 1901. Rotary oxidizing apparatus. The only machine in the world that carries the goods while oxidizing and lisling at all points of the compass. Quickest oxidizer known.

September 9, 1902. Rotary yarn oxidizing apparatus. Also carries the yarn at all points of the compass while in process of oxidizing or steaming.

June 10, 1902. A stationary hosiery oxidizing apparatus. Two different speeds. Especially constructed for lisle thread finish on hosiery or knit goods, equipped with an electric thermometer for the accurate measurement of the dry and wet hot air.

December 10, 1900. Stationary hosiery oxidizing apparatus. Two speeds. Chain and sprocket wheel drive with double clutch to start and stop. Very strong for heavy work, also built for lisle thread finish,

ALSO NOTICE: That My One Dip Sanitary Fast Black in Powder Form is the same black as the Sanitary Oxidize Fast Black Process mentioned at the head of this advertisement, and is a long felt want among the trade, particularly for small concerns whose production would not warrant the equipping of an Oxidize Fast Black Dyeing plant.

This One Dip Sanitary Fast Black is dyed in the open ordinary dye tub at boiling heat in one hour, then washed and softened, if desired, as is done with all other direct colors for cotton hosiery, and has the advantage on the other direct blacks to allow the production of any shade desired from a jet to a very blue black, and matching well the oxidized aniline black.

The cost per 100 pounds hosiery dyed with this black is from $3.50 to $3.80 according to amount of softener used.

This One Dip Sanitary Black is positively guaranteed to be ungreenable to acid test and wear and leave the fabrics as strong after dyeing as it was in the white.

The apparatus required to start dyeing are but two ordinary wood dyer's tubs and one hydro-extractor.

Those wishing to put on their goods so dyed my "Lisle Thread Finish" (Patented) can do so by simply adding to above apparatus one or more of my "Stationary Oxidizing Machines" (Patented June 10, 1902), and take out a license for the use of my patent for lisle thread finish on vegetable fabrics, which will be given free of charge, and all you will have to pay for the use of the machine and the lisle thread finish process, will be but a small royalty for each 100 pounds hosiery given the lisle thread finish.

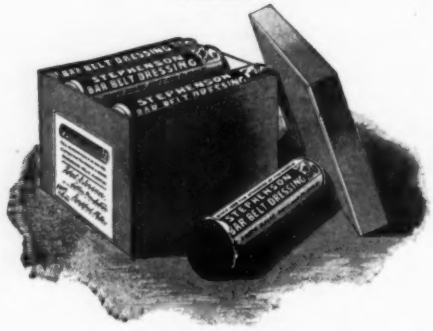
Dyers and manufacturers that are far away may procure a license with full instructions for building the machines economically, paying a small royalty for the use. I have made the royalties low, so that ***no one may be debarred by reason of the price,*** but I mean to protect my patents and will vigorously prosecute any who infringe.

Fast black dye and bleach plants for hosiery, underwear and skein fast black yarn dyeing, installed and equipped complete, if desired. Apply to

A. N. DUBOIS, or KEYSTONE LAW and PATENT CO.,

2170 Sedgeley Ave., Phila., Pa. Betz Bldg., So. Broad and Market Sts., Phila., Pa.

HANDY.



NON-SPILLABLE.

THE subject of BELT DRESSING is not too trivial for the Buyer who wishes to run his mill to its full capacity for the least expense.

Time of idle hands is money.

Spoiled product is money lost.

In buying Stephenson Belt Dressing you are insured against further shut-downs to take up slack belts.

Its many good qualities can only be appreciated by its use.

May we have your next **trial** order, or shall we send you you a free sample by mail?

STEPHENSON MFG. CO., - Albany, N. Y.

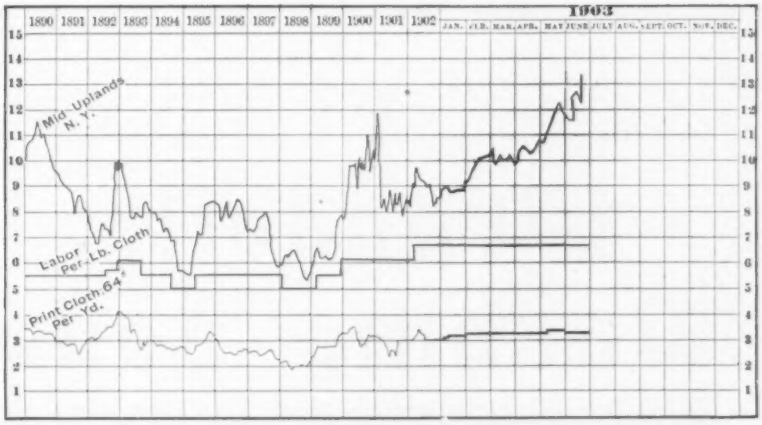

1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900 1901 1902 1903
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
Mid. Uplands N. Y.
Labor Per Lb. Cloth
Print Cloth 64" Per Yd.

CHART SHOWING RANGE IN THE PRICE OF COTTON TO DATE.

The Cotton Market.

The wildest kind of a boom is in progress in the raw cotton market, and prices stand at the highest level reached in fourteen years. In the face of the admitted balance of supply and demand throughout the world it is idle to sit back and denounce the upward movement as the work of scheming speculators whose tactics should be restrained by law. The movement is by no means confined within the walls of cotton exchanges. It finds its cause in the fact that the world needs more cotton than is grown. The upward tendency is strengthened by the absence of any substitute as cheap as cotton itself.

Cotton is the material that clothes the world, and it is no exaggeration to state that the social and industrial organization of the world has been built up and now rests upon an uninterrupted supply of raw cotton from our Southern States. Not only must the world have cotton, but the bulk of the supply must come from this country.

Last month, in the article "A Fair Price for Cotton", we showed the advantage that 11-cent. cotton would be to this country. Since then the price has touched 13 cents, and the difference would place more than $64,000,000 per year to our credit in our trade with foreign countries, making the total annual gain more than $150,000,000, as compared with the 8-cent level of a few years ago.

The high price of cotton, so full of promise to this country, carries discouragement bordering on despair into other lands. Taking a broad view of the field, we find the scarcity of cotton causing distress among untold millions of human beings. No part of the world is so well fortified by high wages as the United States to bear the increased cost of cotton. In all other countries the case is far different, and a rise in the cost of cotton means less food and less clothing for unnumbered millions.

Thus far goods have not been materially advanced in price. The pinch at present is felt by the manufacturers, who are contending with high priced raw material and low priced goods. In foreign business and manufacturing circles a very pessimistic sentiment prevails and is thus expressed by the Liverpool Cotton Gazette:

"It is popular at present to give the problem up in greater or less despair. Such popularity does not solve the problem, and nothing but time will, and a very anxious four months ahead at least confronts the entire trade, before any practical relief whatever can come from the new crop. European and American spinners are partly closing their mills, and some of those who have it are talking of selling their stocks of cotton. There is more talk than actuality. Any office boy must know that every man who sells his precious possession finds in the buyer some one who can use the article to advantage, and in time he will ask himself if this be so, then why cannot he? And the man who sells paper contracts takes on a large and dangerous risk.

We are perfectly conversant with local trade difficulties in selling at a profit either yarns or goods, we do not for a moment seek to minimize those that are real, but does anyone in his senses imagine that the trade of the world is to stop for four months? Surely not! And even if it were possible would prices of the raw material decline in consequence? They never have done so yet in trade history, and whether so-called manipulation accentuates the distress between supply and demand, or whether the latter would by itself sustain or even advance upon present prices is really beside the question."

C. M. BLAISDELL, Pres. and Treas. G. A. BLAISDELL, Vice-Pres. and Sec'y.
Established 1860—Incorporated 1893.
THE S. BLAISDELL, JR., CO.,
COTTON, EGYPTIAN PERUVIAN
American Long Staple a Specialty. Shipments direct to mill from Egypt, Peru and all American Southern Points.
CHICOPEE, MASS.
Cotton Waste Purchased on Yearly Contract from Mills.

FOR THE WOOLEN MILL

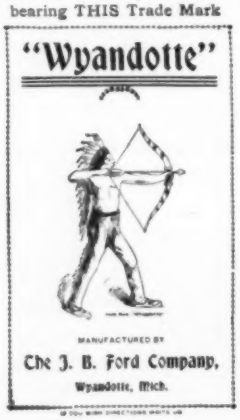
Wyandotte Washing Soda

The Gain is Yours the Risk is Ours

Order from one to five barrels from your supply house. If after a thorough trial, it is not all we claim for it you may return the unused portion at our expense and the trial will cost you nothing.

The J. B. Ford Co.
Sole Mfrs. WYANDOTTE, MICH.

None Genuine except with a Card bearing THIS Trade Mark



In Every Barrel.

IT is a known fact that 90% of the best laundries use WYANDOTTE WASHING SODA for washing flannels and other woolen garments. That caustics and strong alkalies formerly used, no longer find a place in the progressive laundry.

Why this change?

Because "Wyandotte" never shrinks but gives the goods a soft, fluffy feeling that cannot be produced by any other method.

What then is good for the fibre of the finished product is also good for the fibre of the raw material. Equally true what injures the fibre of one injures the fibre of the other.

That wools washed with "Wyandotte" and pure alkali (soda ash) are cleaner, whiter, loftier, much stronger and free from that harsh feeling.

That the finished product washed with "Wyandotte" and soap possesses a peculiar softness and fineness of texture, a brightness of colors, impossible to obtain when soap alone is used.

That Woolen Mills are rapidly taking advantage of these facts; that they are facts and not mere theories Mill men need not take our unsupported testimony.

We shall gladly mail to any interested mill, upon request, a number of testimonial letters from men of acknowledged authority in this industry showing the practical results obtained from the use of WYANDOTTE WASHING SODA.

IT PAYS OTHERS—IT WILL PAY YOU

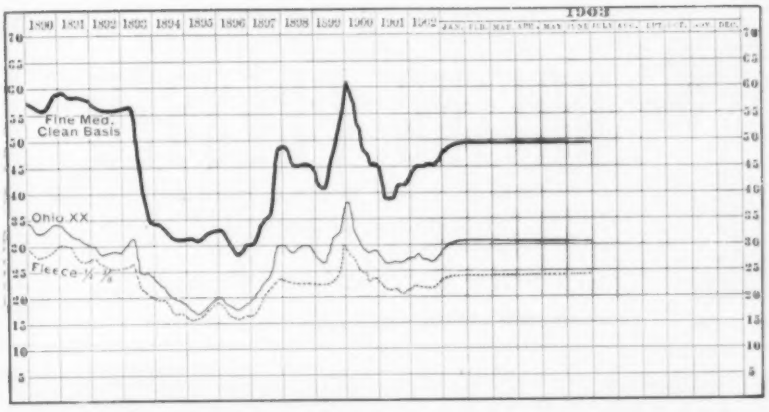


CHART SHOWING RANGES IN THE PRICE OF WOOL TO DATE.

The Wool Market.

With the transference of the new clip to the Eastern dealers and with the opening of the light weight season, trade has become more active and prices have shown a tendency to harden. The change in the price situation does not warrant an alteration of the level on our chart, but consists rather in firmer attitude on the part of owners when quoting prices on wool.

The uncertainty as to the course of the market for light weight goods prevents manufacturers from buying raw material more freely. This uncertainty is accentuated by the unsatisfactory close of heavy weight season. The price of goods does not warrant any advance in wool, and while this may not prevent such advance, it surely will cause manufacturers to offer a determined resistance to it.

So far this month the business in the wool market has been confined to the lower grades at ruling quotations. If wool advances in price without a corresponding rise in the price of goods, it is certain that cotton and wool substitutes will form a still greater part of woolen goods than at present.

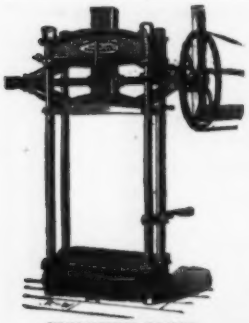
Foreign wool markets are firm but not active. The decrease in the Australian clip continues to materially limit the world's supply. In the domestic market mohair is scarce and higher. The price for the best grade of American mohair is about 40 cents per pound. Foreign stock is 4 to 5 cents higher. While no decided boom in the price of this erratic commodity is in evidence, there is a decided strength to prices and desirable lots are quickly snatched up by manufacturers.

THEODORE JUSTICE. HENRY JUSTICE.
JUSTICE, BATEMAN & CO.
Wool Commission Merchants,
122 South Front St., PHILADELPHIA.

AMERICAN SOAP AND WASHOLINE CO.

Textile, Laundry and Powdered
SOAPS
140-180 Central Avenue,
COHOES, N. Y.
WM. BARNETT, Representative, 730-32 S. Broad St., Phila.
Established 1861. Reorganized and Incorporated 1888.

Standard Quality Combed Ramie Top and Noils a Specialty
SOLE AGENT
FRANK A. TIERNEY
Fine Medium and Coarse Wool Tops. Mohair Tops. Camels Hair Tops
RamieYarns for all purposes in all numbers.
Wools, Tops, Noils.
Fine Medium and Coarse Wool Noils. Camel Hair Noils. Silk Noils.
Room 203, Wool Exchange Bldg.
260 West Broadway, New York



KNUCKLE JOINT.

BOOMER & BOSCHERT

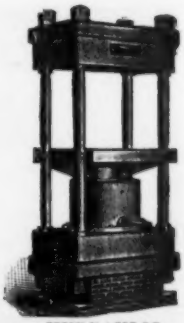
BALING PRESSES

ARE THE STANDARD

Hydraulic or Knuckle Joint
Any Size .. Any Power

Boomer & Boschert Press Co.

338 West Water St., SYRACUSE, N. Y.



HYDRAULIC.

EASTON AND BURNHAM MACHINE CO.,
Pawtucket, R.I.

ALL KINDS OF Spindles
USED IN THE MANUFACTURE OF COTTON, WOOL & SILK

IMPROVED UPRIGHT SPOOLERS
TO SPOOL FROM COP, SKEIN, OR BOBBIN.

WEIMAR BROS.

MANUFACTURERS OF
Cotton Mercerized Tapes,

SPOOL TAPES, BINDINGS AND NARROW FABRICS FOR UNDERWEAR AND OTHER TRADES.

Phone Connections. Works, 2046-48 Amber Street, PHILADELPHIA, PA.

KROUT & FITE MANUFACTURING CO.,

Manufacturers of

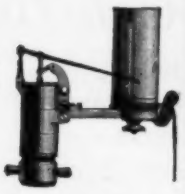
Silk, Cotton and Mercerized Narrow Fabrics

Spool Tapes a Specialty.

Telephone Connection. Office and Mill, Allegheny Ave. and Emerald St., PHILADELPIA.

A Crosby Indicator

In the Hands of a Competent Man Will Increase the Efficiency of Your Plant and Cut Down Your Coal Bill. Faultless in Design. Perfect in Workmanship.



Write for Catalogue.

TRADE MARK CROSBY

Pop Safety Valves
Pressure and Vacuum Gages
Water Relief Valves
Blow-off Valves
Rubber Pump Valves

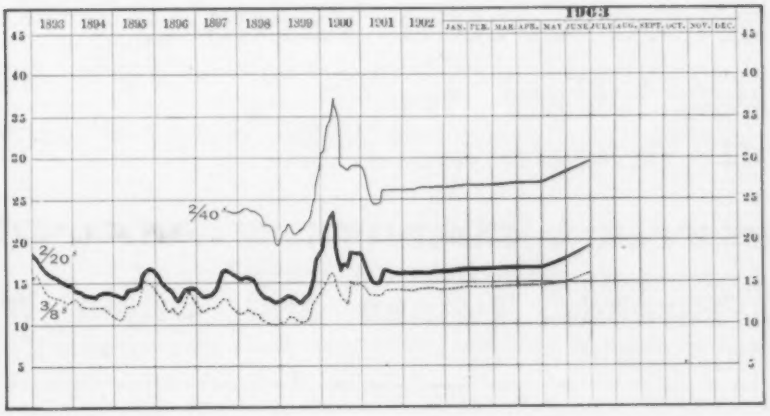
Recording Gages
Single Bell Chime Whistles
Feed Water Regulators
Lubricators—Oil Cups
Gage Glass, Water Gages, Etc.

CROSBY STEAM GAGE AND VALVE CO.

Stores: BOSTON, NEW YORK, CHICAGO, LONDON

Office and Works: BOSTON, MASS.

Yarn Department.



GRAPHIC CHART SHOWING RANGE OF PRICE OF COTTON YARN TO DATE.

The Cotton Yarn Market.

Demoralization is supreme in the cotton yarn market owing to the rise in price of the raw material. Quotations have advanced sharply on all grades of yarn, and, owing to the uncertainty as to the future level of cotton values, spinners are refusing to make contracts at the advance. The strike in Philadelphia would, under ordinary circumstances, have depressed the price of yarn by lessening largely the demand. At present, however, it is but a ripple on the surface. Mills are stopping because of the high cost and scarcity of cotton, and this serves to strengthen still more the price of yarn. Either cotton yarn and fabrics must advance or raw cotton decline if cotton manufacturing is to be a paying proposition, and which of these events will occur a few months will decide.

We quote as follows:

Eastern Cops.

6's	19¾
8's	20
10's	20¼
14's	21¼
16's	21¾
22's	23½
24's	24½
26's	25¼
30's	27¼
34's	27¾
36's	28¾
40's	30¾

On cones, ¾c. more up to 14's; 1c. more from 15's to 22's; 1½c. from 23's to 35's, and 2c. above that.

Eastern Two-Ply Skeins, Carded Peeler.

12's	19-19½
14's	20-20½
18's	22-22½
20's	23
22's	23½
26's	24
28's	25
30's	26
36's	28
40's	30
45's	32
50's	35
55's	38
60's	45

Eastern Two-Ply Warps, Carded Peeler.

2/30's	26-27
2/36's	28-29
2/40's	30-32
2/45's	33
2/50's	36-37
2/60's	45-46

Egyptian Weaving Yarns.
Single Skeins Combed.

30's	36-37
35's	37-38
40's	40-41
45's	43-44
50's	48-49
55's	52-53
60's	53-54
70's	62

Two and Three Ply Skeins, Combed.

30's	39-40
36's	42-43
40's	43-44
45's	45-46
50's	51-52
55's	53-54
60's	55-56
70's	61-62

THE J. R. MONTGOMERY CO.,

Windsor Locks, Conn.

MANUFACTURERS OF

Mercerized Cotton Yarns Gives the High Silk-Like Lustre in Knit Goods and Woven Fabrics.

Novelty Yarns Boucle, Bourette and Spirals, in Cotton, Wool, Worsted, Mohair and Silk.

Cotton Warps on Beams, Jack Spools and Tubes. In Fancy, Twist, Colors and Printed.

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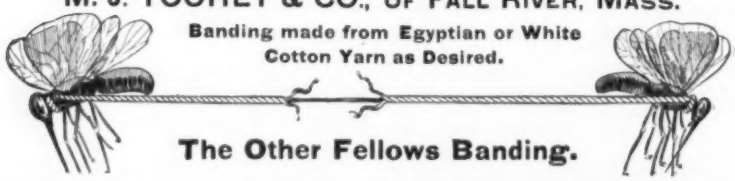
Pawtucket, R. I.

THESE MULES CANNOT BREAK THE BANDING —MADE BY—

M. J. TOOHEY & CO., OF FALL RIVER, MASS.

Banding made from Egyptian or White Cotton Yarn as Desired.



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MONUMENT MILLS,

Manufacturers of

White, Colored, Fancy and Double Twist

COTTON WARPS

HOUSATONIC, MASS. 4s to 60s.

Dana Warp Mills

WESTBROOK, ... MAINE

White and Colored Warps 6s to 50s Single and Ply

Mule Cops From 30s to 50s from American & Egyptian Cotton

Philadelphia Yarn Market.

The yarn market is in a very unusual condition for this season of the year. Prices are higher than at any time during the past twelve or fifteen years, and from the present outlook, spinners will probably be able to maintain the present basis of price until the new cotton comes into the market.

The cotton situation is puzzling all lines of textile industries. A great many spinners are short of cotton, and rather than pay the excessive price which is being asked today are arranging to shut down as soon as their stock of low priced cotton is exhausted. A number of large mills in the South have already shut down. Some of them sold the cotton on hand, claiming they could make a better profit in this way than by manufacturing yarn or cloth. Other mills have paid 13 to 13 1/2 cents to keep running.

The market on hosiery yarn has undoubtedly been affected by the strike of the spinning mills in Philadelphia and Lowell. The market is very bare of high grade carded peeler yarn.

The natural effect of the strike among the textile mills in Philadelphia to lower the price of yarn, has been counteracted by the stoppage of mills in the South and the consequent decrease in the production of yarn.

Some knitters who are figuring on their next season's business are compelled to ask considerable advance over last year's prices; while the jobbers are not willing to pay the advance at present. Undoubtedly they will have to do it later, as yarn will not go anywhere near the low level it reached last summer and fall.

We quote prices, about as follows:

Southern frame cones (good quality):—

7's and coarser	18½-19
8's and 9's	18¾-19
10's	19-19½
12's	19½-20
14's	19-20
16's	20½
18's	21
20's	21½
22's	22
24's	23
26's	23½
30's	24-25
40's	29
50's	36

Southern high grade mule yarn:—

Cones.

10's	20½
12's	21
14's	21½
16's	22
18's	22½
20's and 22's	23-24
24's	24½-25

Southern frame yarn, lower grades:—

6's and 8's	18
10's	18½

Eastern cones (high grade quality):—

10's	21½
12's	22

BUCKINGHAM, PAULSON & CO.
Commission Merchants
COTTON YARNS of all Descriptions
83 LEONARD STREET, NEW YORK
302 Chestnut St., Phila. 210 Munroe St., Chicago, Ill.
Cash Advances, Cash Sales and Prompt Returns. Consignments and correspondence solicited.

JAMES E. MITCHELL & CO., COMMISSION MERCHANTS.
Cotton Yarns
FOR ALL PURPOSES.
122-124 Chestnut Street, PHILADELPHIA, PA.
Brown Building, 185 Summer Street, BOSTON, MASS.

CATLIN & CO.,
Yarns.
67 CHAUNCY STREET, BOSTON.
216 CHURCH STREET, NEW YORK.
206 CHESTNUT STREET. PHILADELPHIA.

Ballou Yarn Co.
PROVIDENCE, R. I.

Harness and Seine Twines and other Job Gassing, Winding, etc. All Numbers.
GASSED YARN SPECIALTIES

A. D. SALKELD & BRO.,
With FRED'K VIETOR & ACHELIS,
YARNS.
66-72 LEONARD STREET, - NEW YORK.

FRED STERNBERG & CO.
Successors to EICHMANN & STERNBERG,
530 Broadway, - NEW YORK.
MERCERIZED TURKEY RED GASSED } COTTON YARNS.
JACQUARD and HARNESS TWINES.

J. S. DODDS,
346 Broadway, N. Y. Life Bldg., New York, N. Y.
MERCERIZED YARNS
Two and Three Ply, for all purposes,
In Peeler, Egyptian and Sea Island, gassed and ungassed, natural and dyed. Fast Black for cross dyeing a specialty.

EDDY & STREET,
Cotton, Woolen,
Yarns and Braids
Worsted, Spun Silk.
PROVIDENCE, R. I.

CAPACITY, 50,000 Spindles. **ORSWELL MILLS** FITCHBURG, MASS.

COMBED **COTTON YARNS** CARDED

In Chains and Skeins, on Balls, Beams, Spools—Single or Twisted.

Crochet Lace Edgings

Spun Silk, Splicing Yarn, Mercerized Yarns, Cotton Warps, Sewing Threads, Tapes, Braids, Domets, Cambrics, Silesias. : : :

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THE MALCOLM MILLS CO.,

MANUFACTURERS OF

FANCY YARNS and POLISHED THREADS.

Offices: 229 Chestnut St., Philadelphia.

Mills: Frankford, Pa.

TRADE MARK E-G YARNS CLOTH

ENGLISH-GREENE CO.

Commission Merchants,

Greene Bldg., 26 Fountain St., Prov., R.I.
53 Leonard St., New York.
300 Chestnut St., Phila.

Consignments Solicited for Southern Mills. Liberal Advances Made and Sales Cashed Promptly.

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Cleans Wool, Floors, Anything.

INDIA ALKALI WORKS, Boston.

Indian Orchard Company.

Cotton Warps and Yarns. In Gray and all Colors, Single or two or more Ply, and Cable Cord.

Novelty Yarns. in Various Patterns, Colors and Twists.

Carded and Colored Cotton. For Mixing with wool. Machined or in Roving.

Indian Orchard, Mass.

E. Morgan, Pres. H. K. Wright, Treas. W. C. Godfrey, Agt.

14's	22½
16's	23¼
18's	23¾
20's and 22's	24-24½
Lower grades Eastern yarn:—	
6's and 8's	18½-19
10's	19-19½
Rise ¼c. per number to 16's.	
Skein yarn (mostly Southern):—	
4's to 8's soft	17-18
10's to 12's	17-18
14's to 20's	18½-20
22's	20-20½
14/2	18½
16/2	19-19½
20/2	20-21
30/2	24
40/2	28
16/3 slack	18½
12/3 slack	18
8/3 carpet	17
8/3 slack	17¼
9/4 slack	17¼
Warps (mostly Southern):—	
14's to 16's	18½-19½
20's to 22's	20½-21
26's	22
14/2	19
16/2	19½-20
20/2	20½-21
24/2	21½-22
30/2	24
40/2	28-29
Mixed colored yarns (mock twist, half colors):—	
6's to 10's	21½-22
12's to 14's	22½-23
16's to 18's	24-25

Silver and jaeger, 1½c. over white.
Mock Egyptian, 2c. advance over white.
Egyptian, 4c. to 5c. above best quality white.

Worsted Yarn.

Spinners are getting but few orders and those are secured at concessions to the weaver, but the bottom prices have been reached, and on certain yarns not only will spinners not make concessions but are advancing prices. Where low prices have been made the weaver got the benefit of the condition of the spinner, who had no orders and who wanted to bridge over until the tide of business changed. It goes without saying that on account of the price of wool there was no profit at the prices spinners made and, consequently, they are now refusing to accept further orders at the low range of prices. Spinners firmly believe that worsted yarns will advance considerably within the next few weeks and they are holding out of the market at present as they do not believe that now is a favorable time to make new prices.

The eastern French spinners are getting some benefit and are losing some orders through the Philadelphia strike. Eastern knitters depending on Philadelphia yarn are placing orders with Eastern spinners, as their machinery is busy and they must have yarn; on the other hand there are sev-

TRY OUR
Silkine, also Lisle Silk
FINISH
—FOR—
Hosiery, Knit Goods, Yarn, Fast Black, Harsh Colors, and Fibres.
O. K. SOAP CO., 968 Franklin St., PHILA.

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COTTON YARNS OF EVERY DESCRIPTION.
114 Chestnut St., Philadelphia.

LINEN YARN IMPORTER.
HUGHES FAWCETT, 115 Franklin Street, NEW YORK.
Flax, Hemp and Jute Line and Tow Yarns, For Weaving Purposes.
Linen Jacquard Harness Twines, Fine Cotton Harness and Heddle Twines, For Cotton, Silk, Woolen and Carpet Manufacturers.
Correspondence solicited. Samples promptly furnished.

C. MOORE & CO.,
Manufacturers of
TWINES, THREADS AND YARNS,
Jacquard Harness Twines of all kind on hand and made to order.
S.W. Cor. Fifth and Market Sts., Phila.

DEXTER YARN CO.
Cotton Yarns in Cops, Cones and Skeins; on Beams or Spools, Single and Twisted, Cable Cords and Twines.
PAWTUCKET, . . R. I.

Walcott & Campbell Spinning Co.
Fancy Hosiery Yarns
IN ALL COLORS
New York Mills, Oneida Co., New York

ALLEGHENY WORSTED MILLS,

Thomas Wolstenho'me Sons & Co.,
MANFRS. OF
ALL NUMBERS
SINGLE AND TWO-PLY,
On Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural and Fancy Mixes.

Worsted
YARNS
Sell Direct,
Office and Mills, Frankford Ave. and Westmoreland St., Phila, Pa.

POCASSET WORSTED COMPANY,

Worsted Yarns.

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PROVIDENCE, R. I.

CRANSTON WORSTED MILLS.

Worsted and Mohair Yarns—White or colors, in skeins, on spools, cones, or shuttle bobbins.

Novelty Yarns—of Mohair and Worsted. We are the only manufacturers in the United States making these yarns from the raw material to finished product and making yarns only.

Genapped Yarns of all kinds. Doup Yarns. Harness Yarns. For Braids, etc.

DYERS OF YARN AND SLUBBING. BRISTOL, R. I.

French System. Bradford System.

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MANUFACTURERS OF

WORSTED AND WOOLEN YARNS,

Office and Mill, Delaware and Cooper Streets. CAMDEN, N. J.

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Selling Agent for
BRISTOL WORSTED MILLS,
HIGHLAND WORSTED MILLS.

Worsted Yarns

ALL QUALITIES AND NUMBERS.
17 Bank Street,
PHILADELPHIA, .. PA.

YARNS

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SUMMER STREET.
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Manufacturers of
Woolen Carpet and Rug Yarns,
Wool Scouring, Carbonizing, Garnetting,
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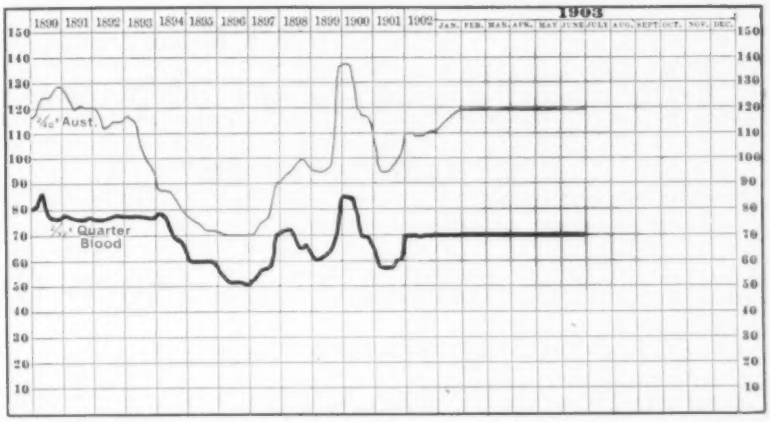


CHART SHOWING RANGES OF PRICE OF WORSTED YARNS.

eral large spinning mills which are shut down because of the strike as these mills have orders with Philadelphia knitters. The knitters are the ones who are largely affected and need yarn.

The weaving mills have not as yet been troubled, but this may suddenly change if there comes a demand for yarn, as many of the mills purchase their supplies from Philadelphia. It is predicted by some that the coming light weight season will be largely a hand-to-mouth affair; that the trade will order cautiously. Last season light weight orders were cancelled extensively and many mills have more or less light weight goods on hand, left over from last season. These fabrics the manufacturers are now trying to sell, and dealers, knowing that the cloth is on hand, are trying to buy at very low prices. In some instances offering just about the cost of the yarn without the cost of production. Manufacturers on the present season and on the coming season are obliged to produce almost impossible values on account of the cost of material.

The advance from 6 to 8 cents in cotton yarn from the former low level is costing weavers of cotton worsteds many orders. Buyers wish to place orders at old prices, but when told this is no longer possible insist that they can buy elsewhere without advance. One large weaver of cotton worsted told the writer that before the advance he had purchased a number of hundred thousand

SILK NOILS AND SILK NOIL YARNS
In White and Colors.
A. T. SKERRY & CO., 47 Leonard Street, NEW YORK.

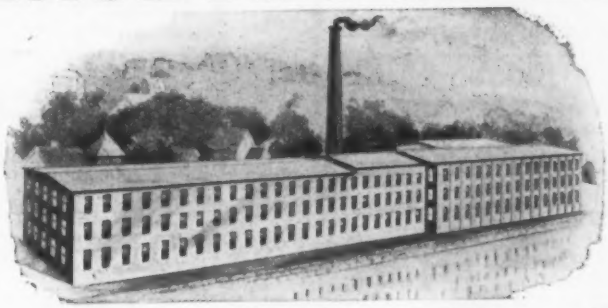
MOHAIR LOOPS, KNOTS AND FANCY YARNS FOR DRESS GOODS & CLOAKINGS.

QUEENSBURY MILLS WORCESTER MASS.

MOHAIR TOPS AND YARNS FOR WEAVING

LUSTRE YARNS FOR SERGE LININGS

ALPACA YARNS



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DRESS GOODS YARNS
KNITTING YARNS
WORSTED YARNS

MOHAIR

CHENEY BROTHERS,

SILK MANUFACTURERS,

——ALL KINDS OF——

Knitting Silks, Ribbons and Piece Goods

USED FOR TRIMMING KNIT GOODS.

TRAMS, ORGANZINES and SPUN SILKS, IN THE HANK, OR ON CONES, FOR MANUFACTURERS' USE. SILK FOR SPECIAL PURPOSES MADE TO ORDER.

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929 Chestnut Street, PHILADELPHIA.
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239 Fifth Avenue, CHICAGO.

WILLIAM RYLE & CO.,

Foreign and Domestic

Spun Silk Yarns and Noils.

Domestic Thrown Silk of every description. Fine Pure Dye Silks for the woolen trade a specialty. Importers of European and Asiatic Raw Silk.

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E. C. HARPER,
WORSTED and WOOLEN YARNS,
MERCERIZED COTTON,
395 BROADWAY, TEL. 1828 FRANKLIN NEW YORK.

Speed & Stephenson,
WORSTED and WOOLEN
YARNS
A SPECIALTY.
ALSO TOPS.
170 SUMMER ST., BOSTON.
Long Distance Tel. 4168-2 Main.

FIRE HOSE CORDS — From long staple cotton—6s to 20s yarn in 2 to 100 ply—16 lbs. without a knot.
COTTON WARPS — On beams—single or ply yarns, grey, bleached or colored.
GLAZED YARNS — All plys—any color—for braiders, harness and sewing threads.
UNIVERSAL WIND — For braider cops—warp yarns—grey or colored—2 inch to 12 inch traverse.

Dyeing facilities are new and best quality work guaranteed. We are prepared to dye yarns for other parties.

WHITTIER MILLS, Selling Office, SPRINGFIELD, MASS, MILL: CHATTAHOOCHEE, GA.

pounds of cotton yarn and that he had now covered all the yarn he had bought, and that he could sell no more without adding to the cost of his cloth. Buyers will pay old prices but run away at any advance.

The result of the advance in cotton yarn will result in a larger use of worsted yarn on the 1/4 to 3/8 Blood order, as the advance of cloth from yarn of this kind is slight. But for all this indication weavers will not buy ahead, as some own heavy weight yarn for which they have had not one order during the heavy weight season. Some weavers believe that the advance in cotton yarn will result in a larger amount of cheap woolen goods being sold. Although spinners anticipate an advance the weavers do not seem to believe in it. They say they are buying yarn cheap enough and should buy yarn as cheap today as one year ago. It is also stated by the weavers that last year they lost money buying yarn at high prices and took yarn for which they contracted at high prices. They bought this yarn at high prices and sold cloth at low prices. They say the coming season will find the spinner in the box they were in last year. They will be obliged to pay high for their material and sell their yarn cheap because the light weight season will be draggy.

The weavers will not consider the cost of wool, and say that the present stagnation in the manufacturing business is due largely to the selfishness of the wool grower of the West, who, although anxious to get the highest price for his wool, buys only the cheapest class of clothing with the least amount of wool in it.

The top market is slow and but few tops are selling although prices are firmly maintained, as the tops on hand could not be replaced for anywhere near the price at which they are being sold for today. Prices are well maintained all along the line.

We quote as follows:

2/40's Australian	1.25
2/40's XX Delaine	1.10
2/40's Half Blood	1.05
2/20's Half Blood	.85
2/36's 3/8 Blood	.75
2/26's 1/4 Blood	.68

Woolen Yarn.

Spinners continue busy with a slacking-down tendency. The weavers continue to buy large quantities of black woolen yarn for filling but are useing worsted warps. It is probable that considerable woolen yarn will be used by worsted weavers in the coming light weight season, as it is a question of using woolen yarn with a small percentage of worsted yarn or a continuation of the present dull period.

The manufacturers of Maine making the cheap cassimeres are securing the bulk of the business for cloth. Yarns are made from a B super wool which has good carrying qualities, into which is mixed quantities of shoddy and cotton. It is because of this demand that B super wool is so firmly held and why yarns made of this class of stock are so high. Many weavers who have been buying large amounts of woolen yarn, although experiencing a

JENCKES SPINNING CO.,
Formerly E. JENCKES MFG. CO.
Carded and Combed Cotton Yarns for Weavers and Knitters.
Double and Twist Yarns for Woolen Trade.
PAWTUCKET, R. I.

WILLIAM B. CHARLES,
Cotton Yarns,
Cotton Cloth,
Silesia, Sateens,
For the Underwear Trade.
AMSTERDAM, N. Y.

GRANT YARN CO.,
COMBED AND CARDED COTTON.
YARNS 40's and above. AND WARPS
FITCHBURG, MASS.

LUZERNE COTTON YARN CO.,
MERCERIZED YARNS.
Mercerizers, Dyers, Bleachers and Coners,
WILKES-BARRE, PENNA.

American Cotton Yarn Exchange
COMBED and CARDED
COTTON YARNS
From Northern and Southern Mills.
American, Egyptian, Peruvian and Sea Islands.
ARNOLD B. SANFORD, Pres. and Gen. Mgr.
PERCY H. de MAURIAC, Vice President.
OFFICES: 67 Chauncy St., Boston.
240 Chestnut St., Philadelphia.
108 Franklin St., N. Y. with James Talcott.

Dixon's Flake Graphite adds to the lubricating power of any grease and any oil greatly out of proportion to the amount used. Actual test shows that one-seventh of the lubricating graphite added to the oil increases the lubricating power one-half. Ask for booklet 120-C.
JOSEPH DIXON CRUCIBLE CO.,
Jersey City, N. J.

Woolen and Merino YARNS
Eaton Rapids Woolen Mills,
EATON RAPIDS, MICH.

JOSEPH M. ADAMS CO.
WOOLEN YARNS,
Carpet Backing and Rug Yarns a Specialty.
ARCOLA MILLS,
Main St., foot of Centre St., Manayunk, Phila.

Woolen and Merino Yarns,
1 to 10 Runs, at reasonable prices.
All Wool, Mohair and Wool Spun or Mixed Cotton and Shoddy Yarns, in white, gray, and colors.
Dress Goods Yarns a Specialty.
E. M. ROCKWELL, - - LEOMINSTER, MASS.

Knitting and Weaving YARNS.
Cones, Cops, Warps, Skeins,
Single, Double, Three-Ply, etc.
Peeler, Egyptian, Mixed Colors.
Large Assortment.
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223 and 225 Chestnut Street,
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SHODDY WM. H. H. SLACK & BRO., Springfield, Vt.
Carbonized Stock a Specialty. **FLOCKS**

M. B. SCHWAB, Pres. H. RAWITSER, Treas.
ED. GLUECK, Sec. and Gen. Mgr.
RIVERDALE WOOLEN CO., MANUFACTURERS OF
.. Shoddies ..
Of every description. Capacity 7,000,000 pounds per annum.
Custom Carbonizing and Garnetting a Specialty.
New York Office.
140 DUANE STREET. RIVERDALE, NORTHBRIDGE, MASS.

falling off of orders and an inability to purchase outside yarn, dislike to face the possibility of others getting in on their machinery space, and make many promises of prospective business in order to hold on to the space until the next season's business has been developed. The reason for this is that they realize that the coming season is likely to be a great woolen yarn season, and woolen yarn machinery has been in such demand in the past that if they lose this space to another manufacturer, they themselves will suffer from an inability to secure yarn.

The overcoating trade is slow on heavy weights, but much business has been secured for light weight covert cloth fabrics. This fabric has been in great demand and much yarn has been made for this purpose.

The Philadelphia strike has stopped some orders for woolen yarn machinery, especially for French flannels; also some warp yarns have been held up. This is mostly yarn produced on Belgian spinning machinery. The rubber boot yarn trade is also beginning to feel the effects of the sharp advance in cotton yarn, as these goods are made with cotton back and wool face, and are sold very close.

The hosiery manufacturers are using much woolen yarn and merino yarn, and much more will be purchased, as the hosiery manufacturers have bought cautiously.

The eiderdown knitters are busy and are buying much yarn. The knitters of underwear using wool and woolen yarn are looking forward to a good business, but have not covered themselves largely with material. The knitters of all kinds of cotton yarn are paralyzed and the knitters of woolen yarn will benefit, as the woolen garments have not advanced and manufacturers can turn them out nearly on old basis. The knitters have in many instances lowered the grade of their underwear and very little fine stock is being used.

Australian lambs' wool is being used sparingly, as on today's market it is worth nearly 80 cents per pound. Manufacturers of fine underwear who are maintaining quality say, that unless a change comes in material they will be forced to advance prices, as everything which goes into their production has advanced. Some knitters are using garnetted thread waste in the place of lambs' wool and are making underwear which is sightly and salable.

The Rag and Shoddy Market.

The close of the heavy weight season has been accompanied by the usual slackening in the demand for rags and shoddy. Prices have remained stationary and confined to quotations rather than to actual business.

Although trade is dull there is nothing in sight to warrant a decline in values. Wool is firm and the price of cotton is soaring. Both of these facts should have a strengthening effect on the rag and shoddy market, for it is to the last named products that the people must turn when wool and cotton cost more than they can afford to pay for clothing.

At this writing many of the shoddy mills are running slack; some are shut down. This is a healthy sign, indicating that the mills are being operated on orders and that when the demand revives buyers will not find heavy manufactured stocks helping

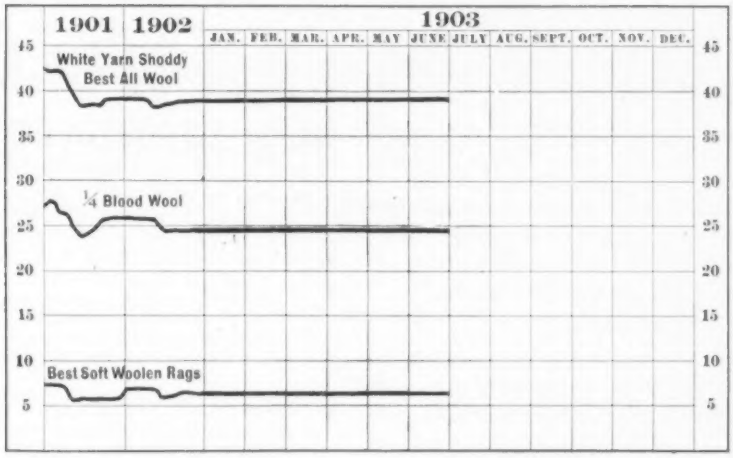

CHART SHOWING RANGE OF PRICES OF SHODDY, RAGS AND NOIL.

them to depress prices below a fair level. We quote as follows:

SHODDIES AND EXTRACTS.

White yarn, best all wool 38-40
White knit, all wool, best, fine 28-32
White knit, No. 2 23-25
Light yarn, extra fine 25-28
New pure indigo blue 23-25
Fine worsted, new black 26
New blue clip, best, fine 20-22
Dark mixed yarn, extra fine 22-24
All wool yarn, medium and coarse grades.... 15-20

Merino.

Fine light, all wool, No. 1 24-25
Medium light, all wool, No. 1 ..... 16½-17½
Medium light, all wool, No. 2 14-16
Fine black, all wool 20-22
Fine dark, all wool, best grade 20-21
Medium dark, all wool, No. 1 13-15
Medium dark, all wool, No. 2 12-13
Red knit stock, strictly all wool 19-20
Red flannel, all wool 19-20
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Dark blue for hosiery, not all wool, No. 2.... 12-14

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Regular gray 12-13
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White hood stock 20-21
Clear hoods 9-10
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Blue stockings 8-9
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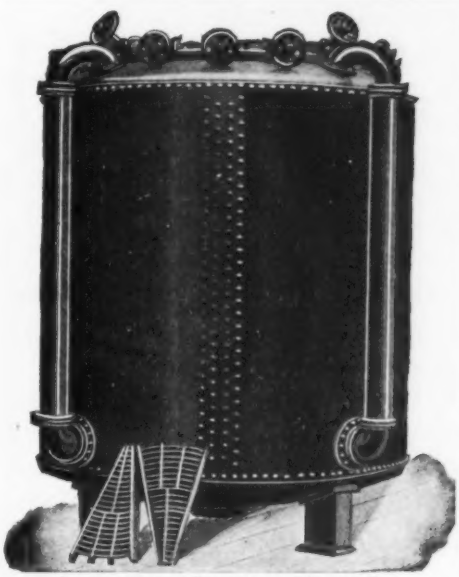

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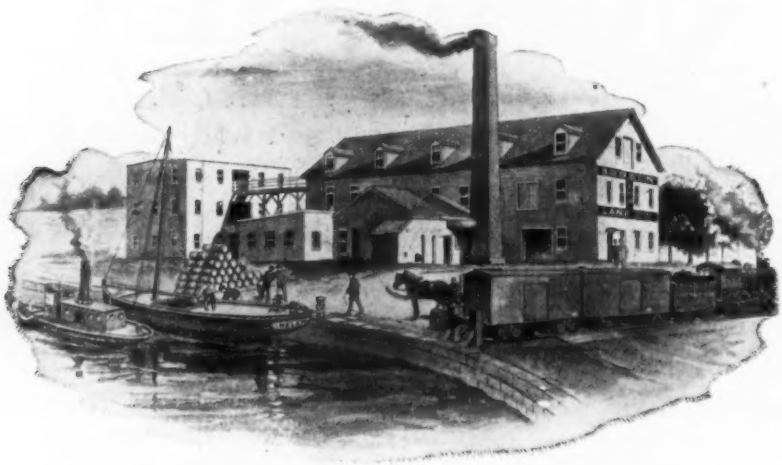

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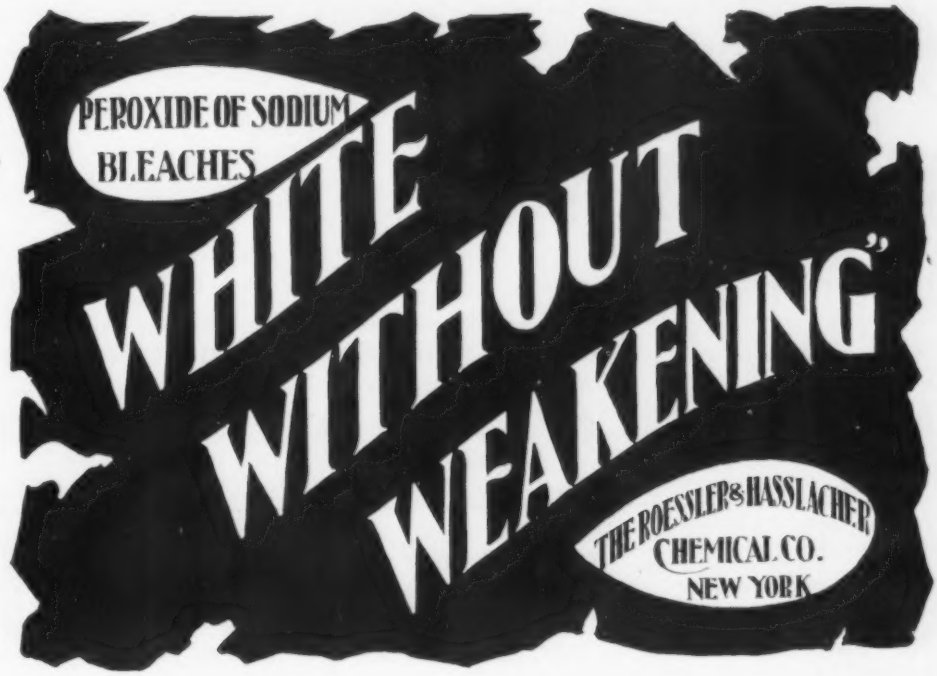
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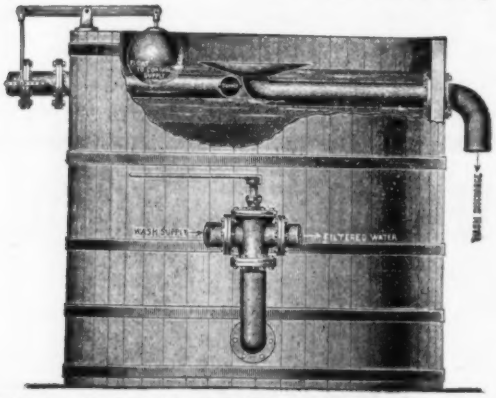

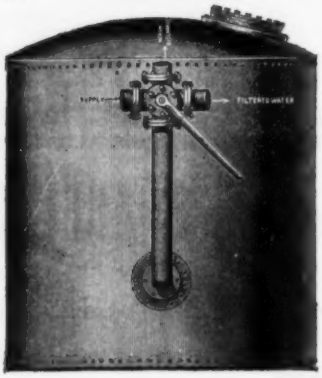

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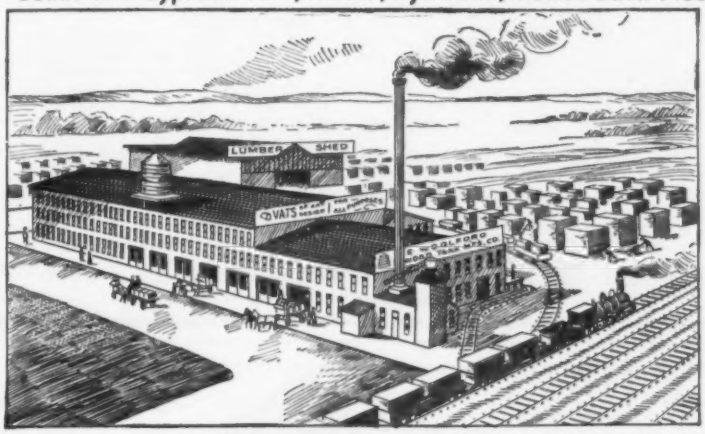

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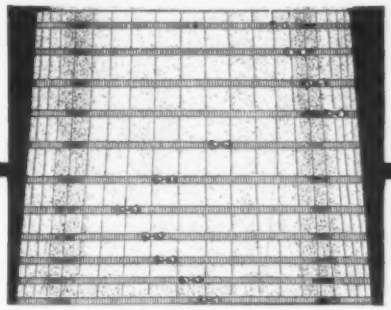

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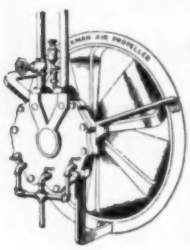

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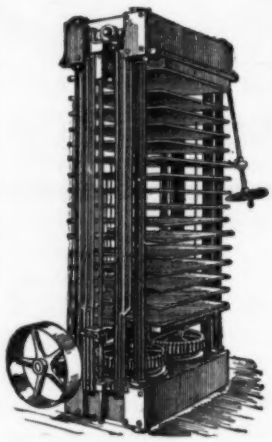

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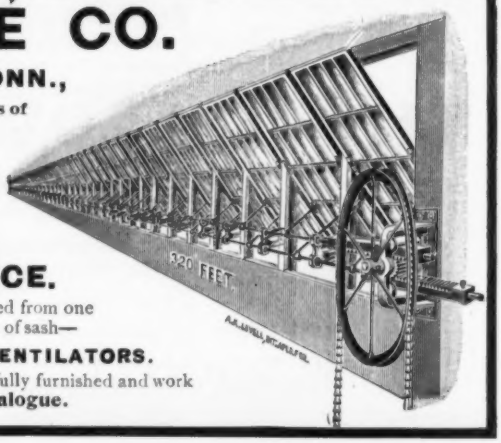
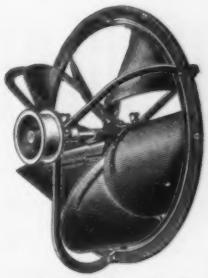
Correspondence solicited. Estimates cheerfully furnished and work guaranteed. **Send for Catalogue.**



We Admit it IS Remarkable

But every word in our new circular about the Berry System applied to Cloth Dryers, etc. is backed up by the mill owners' own statements. Many of these men did not realize that they were not getting the best possible results. You may be in an equally contented frame of mind. If you do not want to be disturbed from your quiet repose, better not read the circular, for it will make you uneasy in your mind until you have found out what we can do with YOUR dryer.



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23 West First St.,
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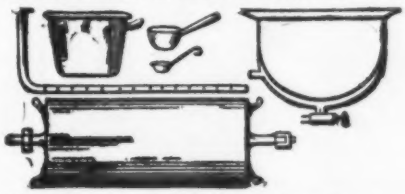
PAUL BEER,

Coppersmith, Manufacturer of Copper Kettles and COPPER LOGWOOD EXTRACTORS (Plain and Jackets)



Copper Steam Pipes, Coils, Dippers, Steam Boards and Heavy-Tinned Steam Cylinders,

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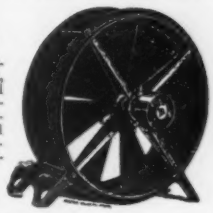
Repairing Neatly Done.

NEW ENGLAND VENTILATING & HEATING COMPANY.

Ventilating, Heating, Humidifying, Cotton and Wool Conveying by Blower System, Tin Cylinders, Roving and Drawing Cans, Separators, Tape Pulleys.



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THE CYPRESS LUMBER CO.

TWO BIG FACTORIES.

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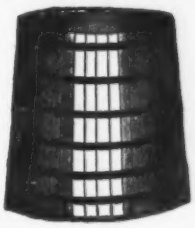

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Main Offices and Works
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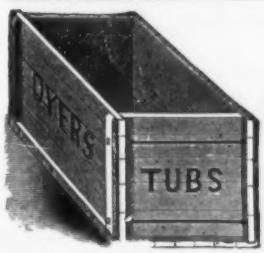
Actively represented all over United States and Canada.

Manufactures and installs sprinkler heads, dry valves and alarm valves. Universally approved by insurance interests. Write for full particulars.



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AMOS H. HALL, SON & CO.,

Manufacturers of

Cedar Vats and Tanks

2915-2933 North Second Street,

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Tubs and Tanks of all kinds for Dyers, Bleachers, Factories, etc.

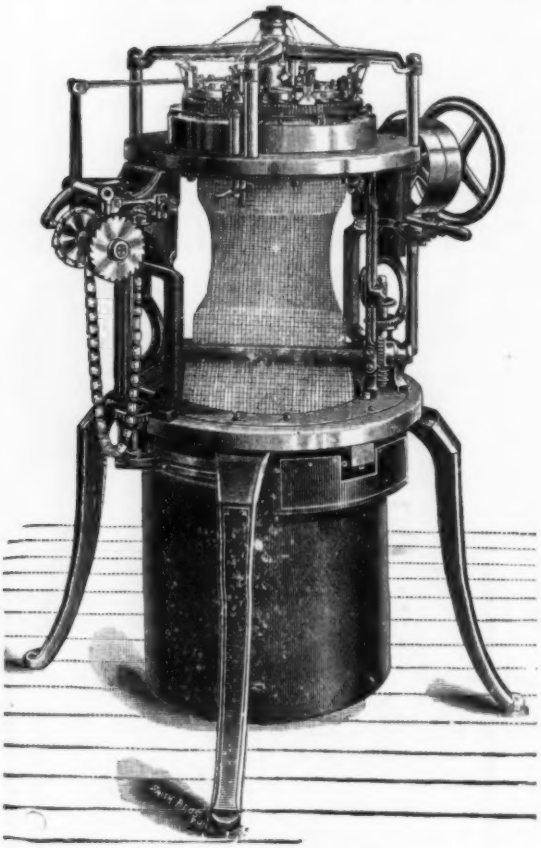
Down Town Office, 140 Chestnut Street, Corner Second.
Hours from 12 to 1.

McMICHAEL & WILDMAN MFG. CO.

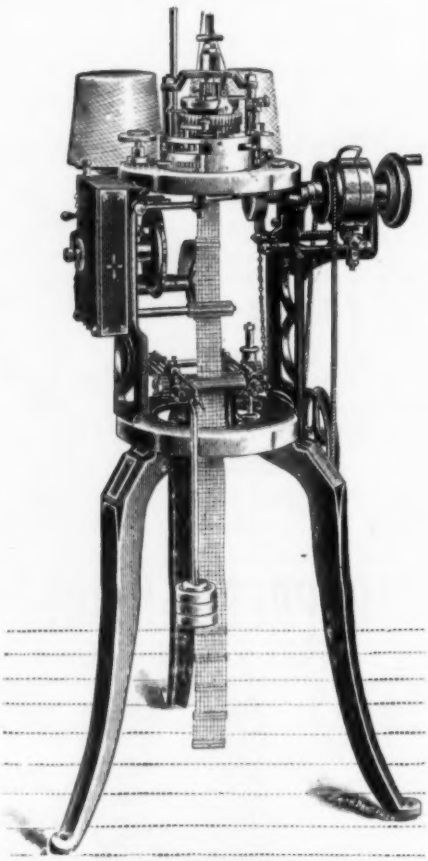
CIRCULAR RIB KNITTING MACHINERY

AUTOMATIC AND PLAIN

For all classes of Ribbed Hosiery and Underwear, Combination Suits, Sweaters, etc.



AUTOMATIC BODY MACHINE.



HOSIERY RIBBER.

ESTABLISHED REPUTATION FOR LARGEST PRODUCTION, BEST QUALITY FABRIC, DURABILITY, ECONOMY OF OPERATION

Full Particulars, Description and Samples Furnished upon Application to the

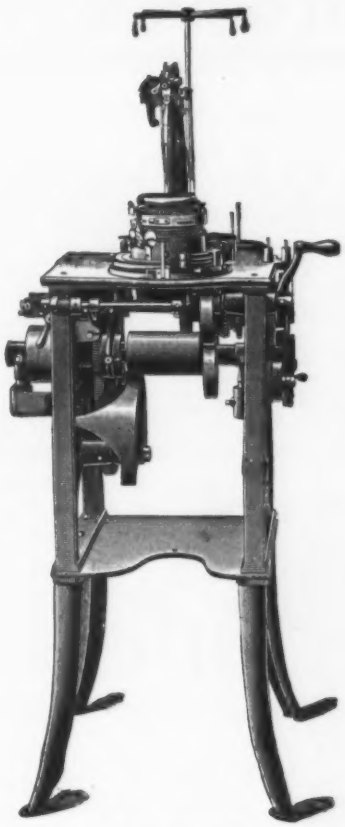
McMICHAEL & WILDMAN MFG. CO.

NORRISTOWN, PENN.

Acme Automatic Knitter

FOR SEAMLESS HOSIERY

ALL KINDS AND GAUGES



Best method of transferring ribbed legs and tops.

Greatest production of perfect work at least cost.

All latest attachments and improvements.

Our new type of machine, just out, having absolutely positive feed on pattern mechanism, which is set by dial, and graduated disc when changing styles and sizes, is one of the greatest improvements in knitting machines for a long time.

For particulars address

MAYO KNITTING MACHINE & NEEDLE CO., FRANKLIN FALLS, N. H.

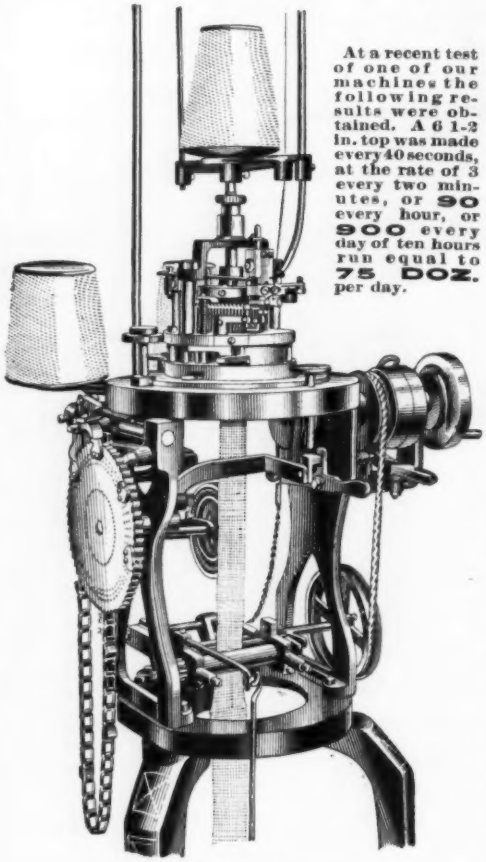
Philadelphia Office: Knickerbocker Building, Cor. 6th and Arch Sts.

We manufacture all kinds of Latch Needles of superior quality.

Write today to the manufacturers of the celebrated

Ruth Automatic Machines

for the most liberal and fairest proposition ever offered



At a recent test of one of our machines the following results were obtained. A 6 1-2 in. top was made every 40 seconds, at the rate of 3 every two minutes, or 90 every hour, or 900 every day of ten hours run equal to 75 DOZ. per day.

PATENTEES AND MANUFACTURERS OF

Ruth Ribber, Ruth Sleever, Ruth Splicer, Ruth Automatic Stop Motion, Ruth Lace Device, Ruth Friction Pulley, Ruth Belt Shift, Ruth Needles.

ALL manufacturers of Hosiery should investigate the proposition referred to and take advantage of this chance to prove the merits of the best machines, costing the **least** money and having the record for the **highest** producing power.

¶ The new RUTH AUTOMATIC STOP MOTION is now ready for delivery, this attachment combines everything that can possibly be covered in the use of a Stop Motion, **new** and **novel** contrivances, simple in themselves but far reaching in their usefulness are embodied in this the latest production of the home of **original** and **practical** improvements in hosiery machines.

¶ The products of this plant are noted for their *simplicity and durability*, together with most positive action of every part. Changes from one line to another can be made almost immediately. They excel in production of most perfect work, with fewer broken needles and minimum number of "seconds."

¶ These products *cost less* and have a *higher* earning power than any other. With all the advantages named the chiefest is not overlooked and that is the best quality of fabric that can be produced. *Absolute guarantee with every machine. Every machine full automatic.*

Ruth Automatic Knitting Machine Co. Box T-W, YORK, PA. Formerly of Norristown, Pa.

Friedberger Mfg. Co.

SPRING 1904 LINE

EDGINGS AND BRAIDS

conceded by competent judges

Head and Shoulders

above all previous efforts both in design and price : : : :

ALL GOODS SOLD DIRECT

Mills at Germantown, Phila.

P. O. ADDRESS, LOGAN STATION, PHILA.

NYE & TREDICK COMPANY,

MANUFACTURERS OF

Circular Rib Knitting Machinery,

UNDERWEAR MACHINERY,

For Ladies' Vests, Combination Suits, Corset Covers, etc., Men's Underwear, Sweaters, etc.

New Improved Sleeve Machines, Machines for Rib Hosiery, Rib Tops and Cuffs.

LATEST IMPROVEMENTS ON ALL MACHINES.

MECHANICAL STOP MOTIONS

For Circular Rib Knitting Machines.

OFFICE AND SHOW ROOMS:

606 ARCH STREET, PHILADELPHIA.

The "INVINCIBLE"

A machine of the highest grade.

Practical and Economical in operation.

A Big Producer.

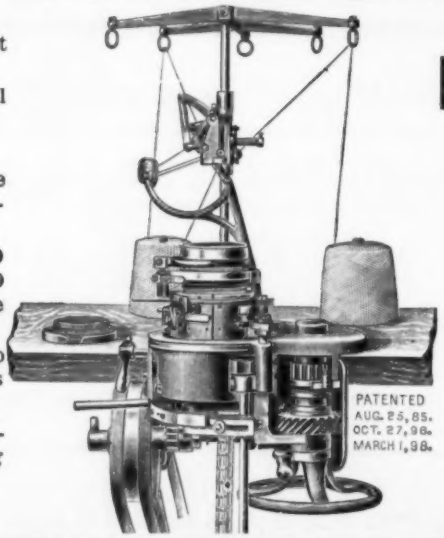
Gauge of machine changed by simple changing cylinders.

The Invincible **METHOD OF TRANSFERRING RIBBED TOPS** is quicker and more positive than others.

No experience required to transfer ribbed tops by this method.

YARN CHANGED automatically without revolving bobbins.

Write for Catalogue.



Full Automatic Knitting Machine

For all kinds and gauges of

SEAMLESS HOSIERY

PAWTUCKET, R.I. U. S. A.

E. JENCKES MFG. CO.

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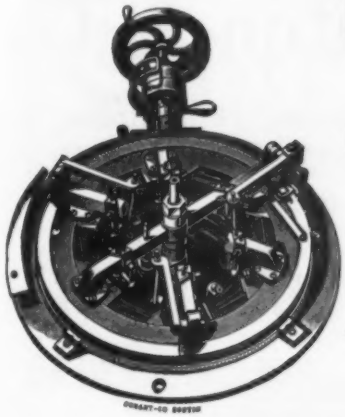
R. M. OATES, Selling Agt., HENDERSONVILLE, N. C.



CIRCULAR KNITTING MACHINES

Either plain or full automatic, with stop motions complete, for

Ribbed Underwear, Sweaters, Cardigans, Cuffs and Anklets.

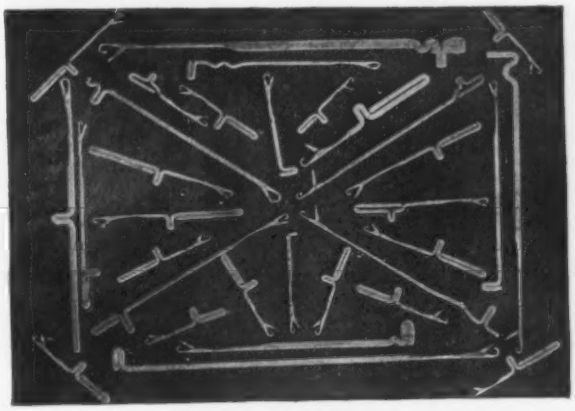
The Leighton Circular Machines are the only ones which **Rack** or **Shog** the needles for fancy borders; also built for automatic striping; and with from 4 to 16 feeds for underwear.

Also Builders of ABEL WINDERS, SEAMERS and LOOPERS.

LEIGHTON MACHINE CO.,
Manchester, N. H.

Latch Needles

For all Knitting Machines.



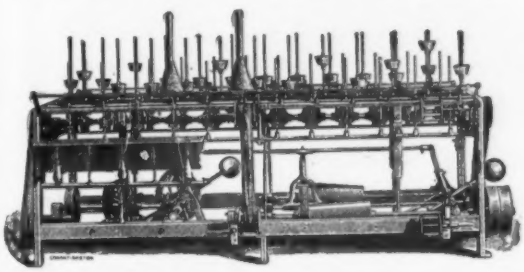
Our Superior or Sunken Rivet Head Needles

Will save you money every day in the year.

Dodge Needle Co., Manchester, N.H.

We now build, with or without differential motion, for winding on Bobbins from Skein or Cop,

THE ABEL WINDERS



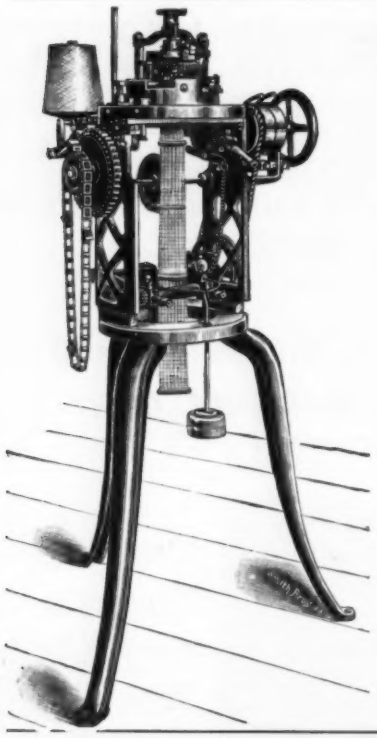
ALSO THE

Abel Seamers and Loopers

IN CONNECTION WITH OUR LINE OF

AUTOMATIC RIB KNITTING MACHINERY.

LEIGHTON MACHINE CO., Manchester, N. H.



H. Brinton & Co.

213-215 Race Street, Philadelphia, Pa.

BUILDERS OF

Knitting Machinery

For HOSIERY and UNDERWEAR.

Complete Estimates Furnished. Send for Particulars.

The cut shows our **Improved Automatic Ribber** with Welt and Slack Course for Half Hose, Tops and Ribbed Legs.

Adams Rib and Top Cutting Machine

FULLY AUTOMATIC.

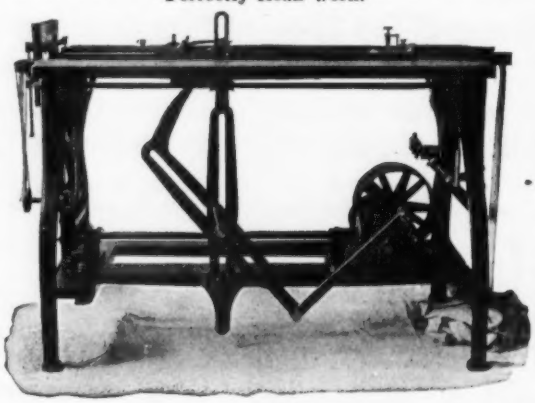
Cuts all Fabrics with or without Welts. Requires no trimming after passing through machne. Perfectly clean work.

Solidity.

Simplicity.

Absolute Positive Movements.

Best Materials.



Cutting and Working Parts Hardened Steel.

Easy Running.

False Welts cut out automatically. 1,500 dozen pairs, cut per day by one operator.

Saving of Labor and Goods. Can be operated by boy or girl. Accidents impossible. No Special Attachments. Patented in the U. S. A. and Europe.

Sole Manufacturers and Agents for the U. S. A.,

McMichael & Wildman Manufacturing Co., Norristown, Pa

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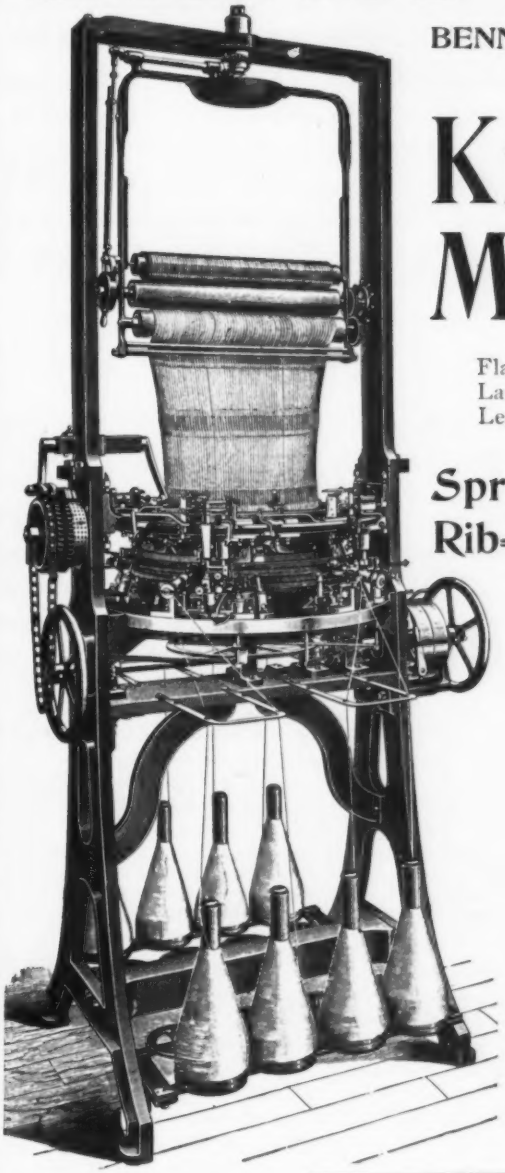
BENNINGTON, - VERMONT,

MANUFACTURER OF

Knitting Machinery



Flat and Circular Rib, both Spring and Latch Needle, Plain Circular Machines, Lead or Trick Cylinder.

Spring Needle Cylinder Rib-Top Machines

For making Cuffs, Drawer Bottoms and Shirt Borders.

Spring and Latch Knitting Needles,

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Sinkers, Jacks etc.

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OF ALL KINDS. **NEW AND SECOND HAND.**

A RARE OPPORTUNITY TO BUY.

1 Reliance hollow plate screw press, 10 plates 34 by 45.
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16 Beattie loopers, 14, 16 and 18 point.
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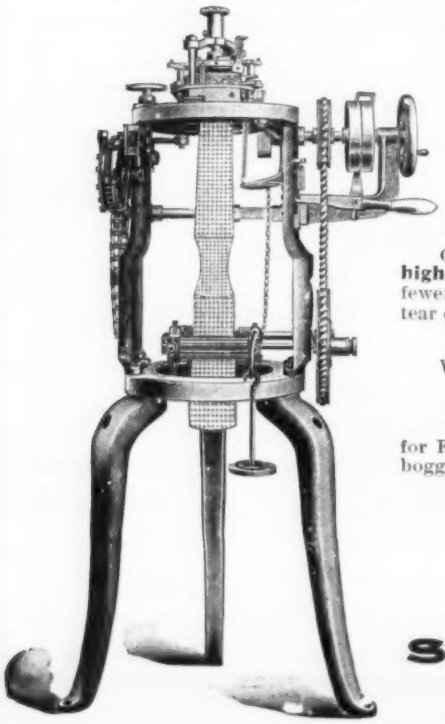
1 Lamb 10 inch power border machine, auto. rack and drop locks.
23 Ribbed underwear machines, 6 to 20 inch.
1 plant of 20 Kutz auto. knitters, 176 needles, with engine, boiler and full complement of all machines necessary for making hosiery.
66 Brinton ¾ auto. knitters, sizes 2½ to 3½ in.
100 Welting and trimming machines.
20 McMichael & Wildman automatic ribbers and sleevers.
2 Skein winders, 24 spindles.
1 Cop winder, 42 spindles.
2 Double Rib Machines.
1 Warping mill and creel.

WRITE FOR COMPLETE LIST.

We are always in the market to buy good second-hand Knitting and Finishing Machinery.



High Speed Rib Knitting Machinery.

Our latest model machinery has been designed to run at **very high speed**, giving large production. This is accomplished with fewer seconds, less breakage of needles, less jar and wear and tear on machines than has been customary at lower speeds.

We also make Special

STRIPING AND DESIGNING MACHINES

for Fancy Golf Stockings, Bathing Suits, Sweaters, Toques, Toboggan Caps, Skirts, etc.

Our Machinery gives large production at low cost and enables manufacturers to meet the market always and make a profit.

STAFFORD & HOLT,

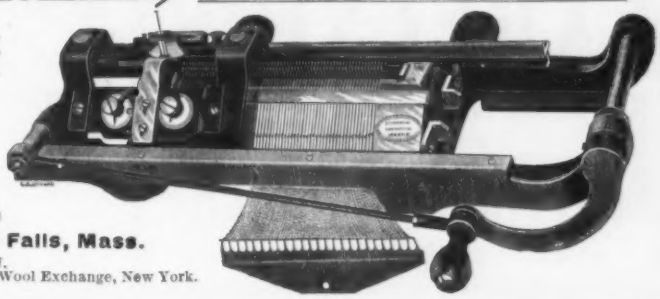
LITTLE FALLS, N. Y.

The LAMB, LEADER OF KNITTERS,

Original and Still the Best.

Most widely used; being operated in every civilized country in the world. For description, prices, etc., see catalogue.

CIRCULAR MACHINES,
RIB TOP and
SEAMING MACHINES.



LAMB KNITTING MACHINE COMPANY,

P. O. Box 5888, Chicopee Falls, Mass.

J. E. WOODHEAD, 100 22d St., Chicago.
L. D. SANBORN, Room 505 Wool Exchange, New York.

THE BEST

Full-Fashioned Hosiery Machines

Simplicity, durability, large production, fine work are the characteristics of the machines for knitting fashioned hosiery made by the

CHEMNITZER

WIRKWAAREN - MASCHINENFABRIK

(Formerly Schubert & Salzer)

CHEMNITZ, GERMANY.

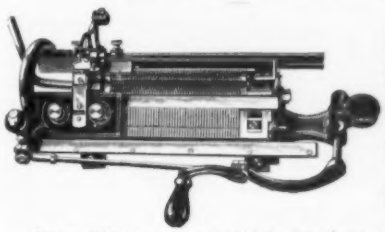
Representative for the United States,

OTTO WALTHER, 591 Bourse Building, Philadelphia.

Best Knitting Machines

IMPROVED CONSTRUCTION

For Hand and Power Driving.



High Speed, Excellent Workmanship.

Auto. Rib-top, Fancy-stitch Jacquard Machines.

Everywhere in work. **80,000** Machines sold.

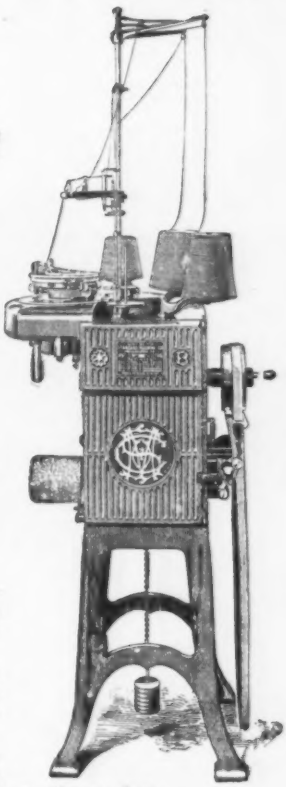
CLAES & FLENTJE,

Muhlhausen, Thür, Germany.

Standard Machine

Superior to All Others in Economy of Operation, Production and Fabric.

Best Built, Easiest Operated, Superior Fabric.



STANDARD B, Automatic Double Sole and all Improvements.

STANDARD C, the only Automatic Heel and Toe Changer.

STANDARD D, Automatic Striping Machine, none other in the market.

STANDARD MACHINE CO.

508 Ludlow St., PHILADELPHIA, PA.

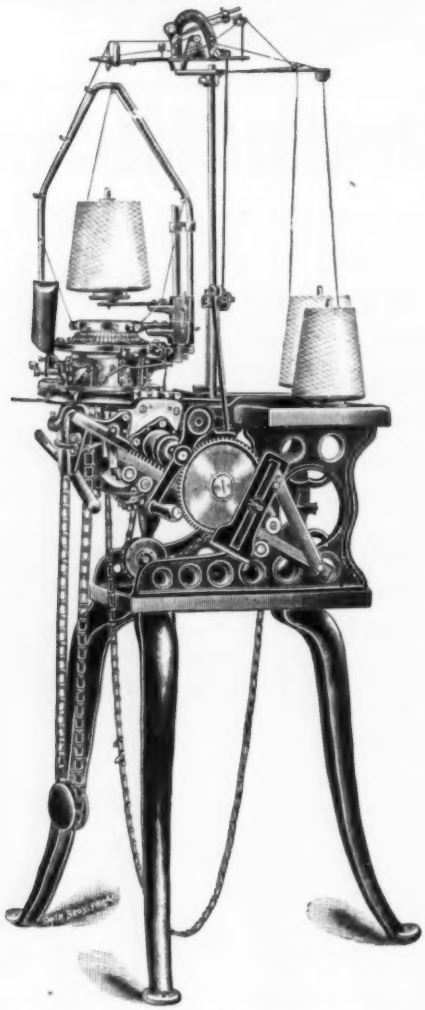
Estimates Furnished for Complete Hosiery Plant.

EXCELSIOR

Knitting Machine Mfg. Co.

BUILDERS OF

KNITTING MACHINERY



Two-Feed 7-8 Automatic for Ladies String Work, also Black Legs with White Feet.

Regular 7-8 Automatic for all classes of Cotton Hose. Special 3-4 Automatic for Wool.

Allentown, Pa., U. S. A.

BANDS, BUTTON STAYS, FACINGS, ETC.

——Can be made correctly only on the——

Kennedy Universal Automatic Band Folding and Cutting Machine. ACCURACY, SPEED, DURABILITY.

KNITTING MILL SUPPLIES.

THOS. KENNEDY & SON, Cohoes, N. Y.

National Spring-Beard Needle MACHINE

For Seamless Hosiery.

The only Machine on which the speed is advertised.

This Tells the Whole Story.

Best results guaranteed at 300 to 400 revolutions per minute, according to guage, hence the largest production by 25 to 40 per cent. over all other machines. Least cost for repairs, smallest needle breakage and lowest per cent. of menders. Full automatic, practical double-sole and high-heel splicer. Device for producing a great variety of lace effects, with no breakage of stitches and no infringement.

For full particulars, call or address

NATIONAL AUTOMATIC KNITTER CO.,

724, 726, 728 Cherry Street,

PHILADELPHIA.

PAXTON & O'NEILL'S

3-4 AUTOMATIC KNITTER

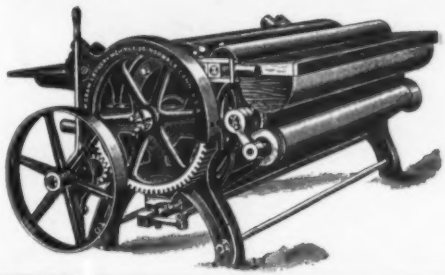
FOR ALL KINDS AND GUAGES OF SEAMLESS HOSIERY.

Has the preference wherever used over 7-8 and full automatics. Because it makes as much or more goods and bet'er goods. Costs less for repairs. Gives less trouble to fixers. Range on Half Hose, from the coarsest to 260 needle.

Exclusive rights to BROWN'S ATTACHMENTS FOR LACE EFFECT.

Cylinders and Dials for all size Machines. **127 Bread Street, Phila.**

AUTOMATIC IRONING and PRESSING MACHINE for KNIT GOODS.



This machine irons and presses ribbed and flat underwear, giving a fine, smooth finish and most attractive appearance to the goods, not to be obtained in any other way. It does not break buttons. Inexpensive and easy to operate, and has large capacity. Knitting mills using them are greatly pleased with results. This method of finishing is sure to come into universal use. Send for further particulars to

J. W. CRAW LAUNDRY MACHINERY CO.,

SOUTH NORWALK, CONN.

HEPWORTH & CO.'S

Patent Single-Stitch

LOOPING MACHINE.

Needle working from the inside, avoiding the breaking of needles and points and picking up the metal.

Single and Double Stitch, or Both Combined.

JOHN W. HEPWORTH & CO.,

N. W. Cor. Lehigh Ave. and Mascher Street,

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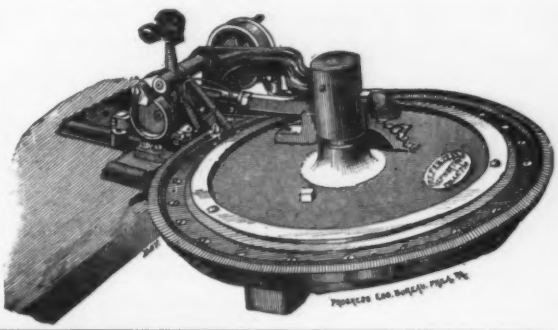


Drying Forms.

BOARDS FOR FAST BLACK DYERS.

HOSIERY FINISHING BOARDS.

BEST WORK. PROMPT SERVICE. PRICES ALWAYS RIGHT.

JOS T. PEARSON 1815-21 TAYLOR ST. KENSINGTON PHILA

Hosiery Boards.

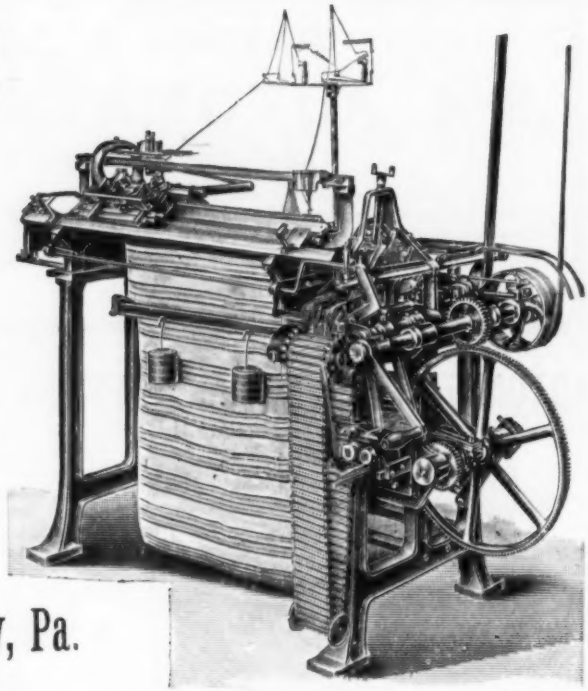
German Knitting Machinery

For Fancy and Full Fashioned Goods.

Our Specialties are for Machines for Knitting **SWEATERS, GOLF JACKETS, FANCY VESTS, Etc.,** in **Plain, Honeycombed** and **Other Fancy Stitches.**

Our Steam Power Machines are fully Automatic. One operator attends four machines.

Also Hand Power Machinery. Also Underwear, Glove and Mitten Machinery.



E. H. LUDWIG, Hawley, Pa.

WOLFGANG RICHTER,

Importer and Builder of

Full Fashioned Knitting Machinery

N. E. Corner Third and Green Streets, PHILADELPHIA, PA.

IMPORTANT.

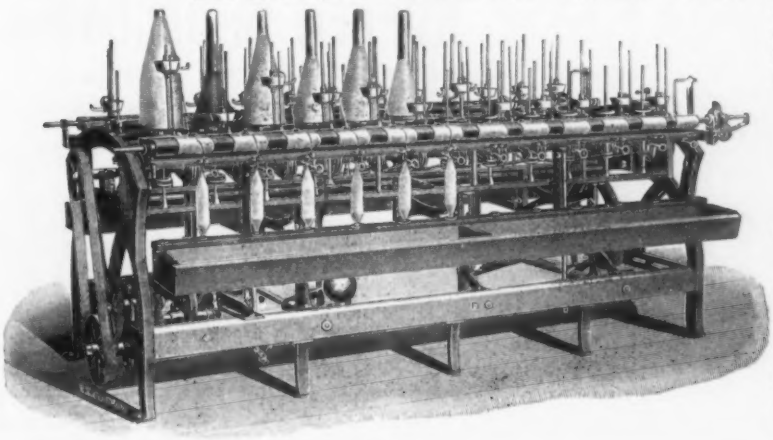
We have just issued our 1903 General Catalogue and 2 Special Catalogues, comprising all classes of . . . **Hosiery Machinery** They contain all information that can possibly be given and we ask all interested to apply to us. Will be sent post free on application to WILDT & CO., Leicester, England.

Agents for Bolton's Unshrinkable Process for which the sole right for U. S. A. is for disposal.

Has already been sold for Canada, Germany, England, Norway and Sweden, Denmark, Italy, Switzerland, Etc.

OVER 1,400 PAYNE WINDERS IN USE

For Hosiery Mfrs., Wind for Cop, Skein or Bobbin.



G. W. Payne. G. M. Fanning.

GEO. W. PAYNE & CO

[Est. 1885, Payne & Mathewson.]

Builders of the

Improved

Upright Spoolers,

To Spool from Cop, Skein or Bobbin.

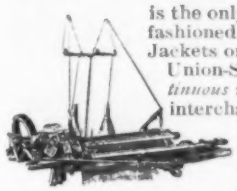
Doubling Spoolers, for doubling 2, 3, or more ends into one,

Upright Quillers, Quill from Cop, Skein or Bobbin.

Ring Dresser, Spooler and Reel Spindles, Cop Skewers, Warp, Spool, Spooler, Guides, Bolsters and Stops Made and Repaired at Short Notice.

OFFICE, 102 BROAD STREET
Pawtucket, R. I.

The Grosser PATENT FLAT KNITTING MACHINE



is the only reliable machine for full-fashioned Sweaters, Cardigan or Golf Jackets or Vests, Gloves, Underwear, Union-Suits, etc., that gives *continuous* satisfaction. All parts are interchangeable on our new style. The only automatic Machine for Jacquard Honey-Comb or Seamless Shaker Sweaters. We have the only first class High Speed 2 thread Lockstitch Overseamer for selvedged Knitgoods, that will sew in Sleeves or hem in double Bottoms on Sweaters without puckering. ***ARTHUR MUELLER, 780 Madison St, Brooklyn, N. Y. Telephone 665a Bushwick.***

CRANE MFG. CO. Lakeport, N. H.

Spring Needle Circular

KNITTING MACHINE.

For Hosiery, Shirts, Drawers, Jersey Cloth and Stockinet.

A Specialty of Hardened Bladed Burr Wheels with Self-Oiling Brackets.

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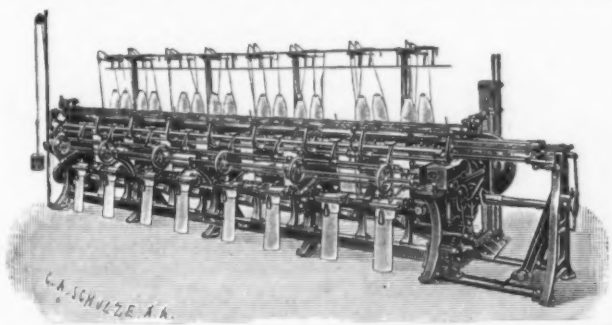
UNDERWEAR AND SEAMLESS

Full Fashion Hosiery Machines. ESTABLISHED 1866 **Sewing and Finishing Machines.**

Largest Permanently Operating Knitting Exhibit in the U.S.A.

SEYFERT & DONNER, CHEMNITZ, GERMANY.



BUILDERS OF ALL KINDS OF

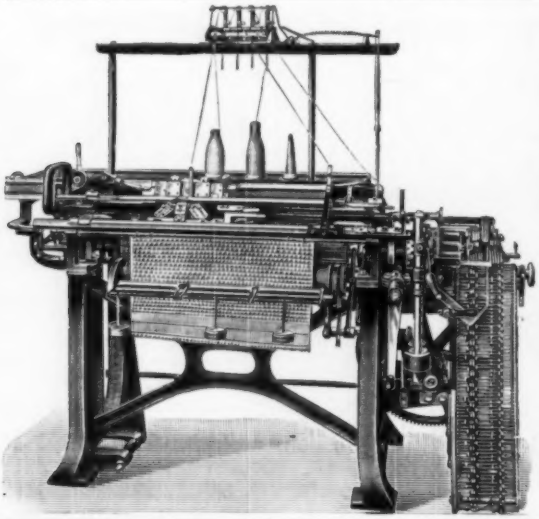
Flat Knitting Machines

(LATCH NEEDLES)

This cut shows the **AUTOMATIC NARROWING MACHINE**, eight at once, for the manufacture of plain, seamless legs of Ladies' hose in endless bands with dividing thread. These legs, footed on the Circular machine, give the most perfect and cheapest full fashioned seamless hose that ever existed on the market.

N.B.—Narrowing Machines are built in various types for the manufacture of all kinds of underwear, garments, etc

FULL AUTOMATIC POWER KNITTING MACHINES—Independent Heads. Patentees and sole makers of the **"TEUTONIA,"** best and quickest hand-knitting machine for hose and half hose. Griswold heel, narrowed toe.



Full Automatic NOPPEN & JACQUARD MACHINE

For High-Grade Sweaters, Jerseys, Etc. in latest plain and colored patterns.

Most durable, simplest construction! Easy to operate and adjust! Recognized as the Best in the market. One operator attends to 3 of these machines! Only reliable machine for above articles.

HIGH SPEED! LARGE PRODUCTION!
IN USE EVERYWHERE!

CLAES & FLENTJE Mühlhausen, Thur, GERMANY.

Ask for samples and full particulars. State gauge and size you need.

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For Ladies', Gents', and Children's Goods.
LATEST STYLES.
BEST WORKMANSHIP.

MAKER OF

Drying Form Boards

OF EVERY VARIETY.

Pepper Machine Works

Lakeport, N. H.

Successors to
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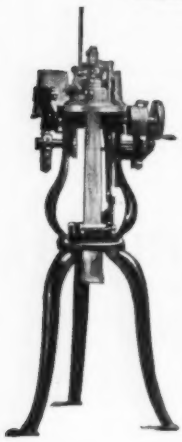

Manufacturers of

Knitting Machinery,

INCLUDING

Pepper's Flat Ribbed Cuff Machines,

Automatic Welt and Loose Course Machines for Stock Tops. New Circular Stripers with Welt, Loose Course and Striping (Automatic), for Short Cuffs, Sock Tops, Hose Legs, Wristers, etc.

Golf and Bicycle Stocking Machines,

ALL KINDS OF

CIRCULAR RIBBED MACHINES

For Men's Underwear, Ladies' and Misses' Hose Legs and Leggins.

Correspondence Solicited.

A. McMICHAEL,

Machinist,

Repairs to Hosiery and Underwear Machines, Cylinders and Dials of every description.

FINE MACHINE WORK.

22 Armat Street, near Main, Germantown,

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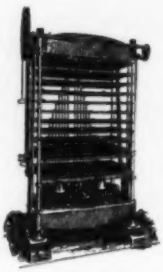
We HARDEN all CYLINDERS and DIALS large and small.

The CRAWFORD



HOLLOW STEAM

PLATE PRESS

For Knit or Woolen Goods.

The most reliable machine of the kind on the market.

PRESS PAPERS and FENDERS.

SPENCE & RIDEOUT,

Successors to
J. J. CRAWFORD & SON,

NASHUA, N. H.

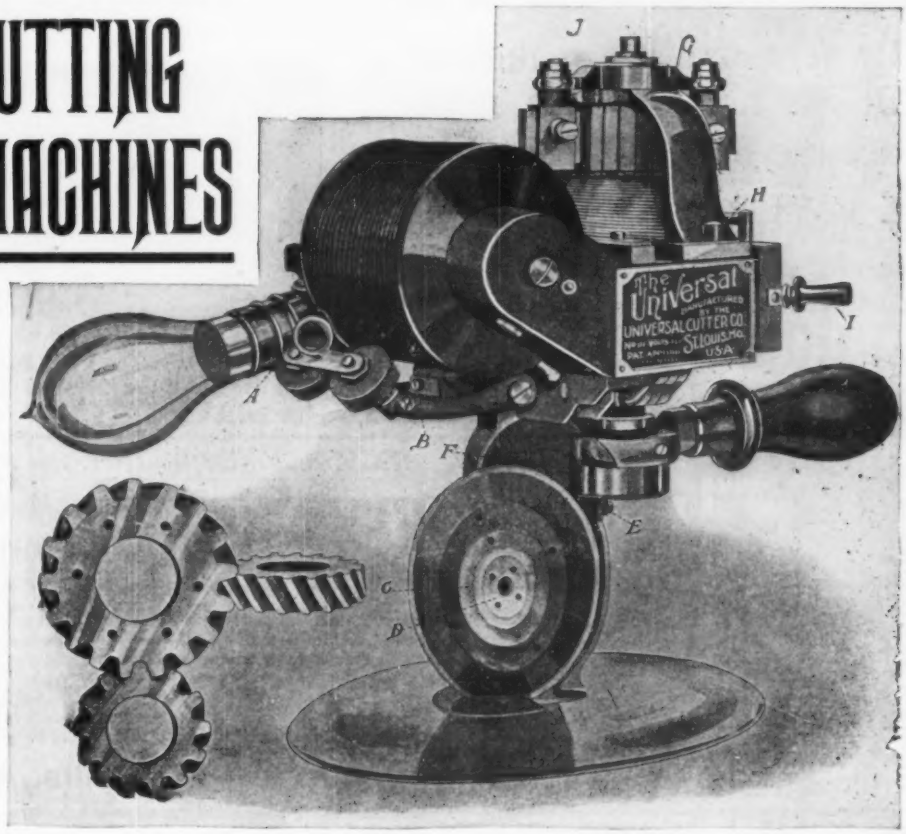
Established 1868.

Universal Cutter Co.

4567-4569 Scott Avenue, ST. LOUIS, MO.

FRED BAUMANN, Jr., Eastern Mgr., 467 Broadway, NEW YORK.

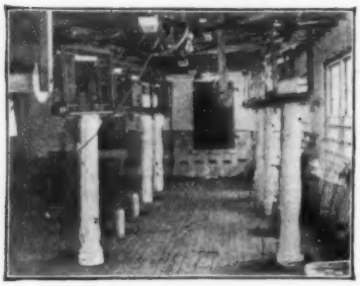
CUTTING MACHINES



Made to be operated by direct current, 110 or 220 volts.
What electric current have you?

UNIVERSAL CUTTER WILL DO THE WORK BETTER AND CUT A GREATER QUANTITY OF KNIT UNDERWEAR, or Fleeced Materials, THAN ANY OTHER CUTTING MACHINE ON THE MARKET

Made in 3 sizes Circular Knives:—Gem, 3 1-4-inch Knife, weight 15 lbs.; Prima, 4-inch Knife, weight 24 lbs.; Giant, 5 1-2-inch Knife, weight 27 lbs. 2 sizes Straight or Reciprocating Knives. Send us sample of material you desire to cut, stating thickness you want to cut at one time, and we will advise you as to which size is best adapted to your wants.

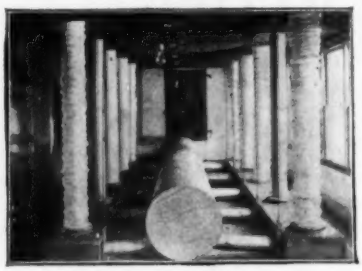


Manufacturers!

DO YOU RECOGNIZE, those of you that have not as yet tried the *New Improved Vertical Dryers* of mine, how much ahead of you the up-to-date mills are that have adopted them as a standard? New orders and duplicates from customers prove this.

Owners of other makes of Dryers acknowledge mine are the Best in use to-day.

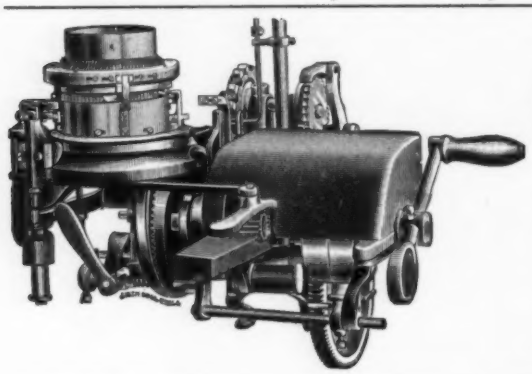
Mills in Vermont, Massachusetts, Virginia, Ohio, Georgia, Alabama, Wisconsin, and even Canada, and largest mills in New York tell me it is only a question of time before all mills will have to have them as they cannot afford to use any other.



12 Vertical Dryers in Utica Dyeing Co. occupying floor space only 12 by 18.

No Traveling Men. *Made and Sold only by*

E. M. Antisdel, Utica, N. Y.



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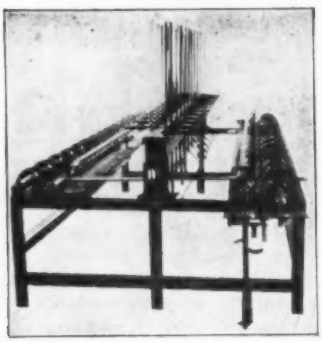
KEYSTONE KNITTING MACHINE MFG. COMPANY.

"INCORPORATED."

Our New Knitter is nearly Full Automatic. You knew our old Keystone, it was a good one. This one is just as good. It is a simple durable knitter, having but few parts, and remarkable for its absence of springs, and small features. Capable of a large production and guaranteed to produce good work. Machine without change can be used for transfer work, or ladies' shaped hose.

2600 N. Sixth St., Phila., Pa.



Germantown Hosiery Machine Works

Lindley's New Automatic Power Glove Fingering Machine, Cardigan Jacket and Circular Knitting Machines for Shirts and Hosiery.

Germantown Skein Winder and Links for Double Ribs

Cylinders and Dials of all kinds made and hardened. Special Machine and Jobbing Work promptly attended to. Also equipped to do general repairing of Platt's Cotton Spinning Machinery. Correspondence solicited.

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MANUFACTURER OF ALL KINDS OF

SPRING KNITTING NEEDLES

NEW BRUNSWICK, N. J.

PAGE NEEDLE CO.,

MANUFACTURERS OF

LATCH NEEDLES

of all kinds. Warranted in every respect.

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Agents: J. E. Woodhead, 100 Twenty-second Street, Chicago, Ill. Durbrow & Hearne Mfg. Co., 12 Wooster Street, New York. James Taylor, 835 Arch Street, Philadelphia, Pa.

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MANUFACTURER OF

Screw Riveted Balmoral and Double Rib NEEDLES

(Patented May 6, 1890.)

All Work Guaranteed. MANCHESTER GREEN, CONN.

WM. COREY CO.,

Manufacturers of Knitting Machine

Latch Needles,

MANCHESTER, N. H.

EXCELSIOR NEEDLES.

The best Hosiery Needles in the market.

Manufactured by

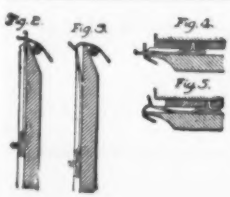
WARDWELL NEEDLE CO., Lakeport, N. H.

Manufacturers' Supplies Co.

418 ARCH STREET, PHILA.

Needles and Supplies for Knitting Mills.

Agents for EXCELSIOR NEEDLE CO., and NATIONAL NEEDLE CO.



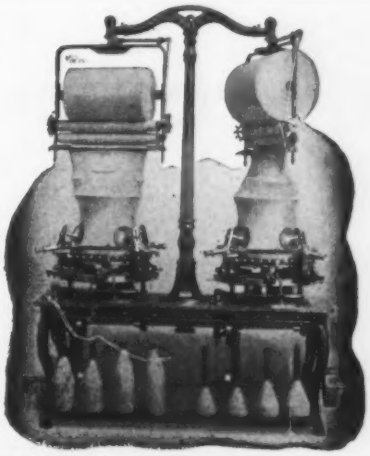
A NEW AND VALUABLE IMPROVEMENT

On Rib Frame Cylinders and Dial.

Saves Mending and also Breaking of Needles.

For Information Address

John Adams, 2416 Hazzard St., PHILADELPHIA.



TOMPKINS BROS. Troy, N. Y.

Knitters, Winders, Burrs, Attachments.

The **New "Victor"**

KNITTING MACHINE.

A full automatic seamless machine, thoroughly interchangeable in all its parts. More simply constructed than any other.

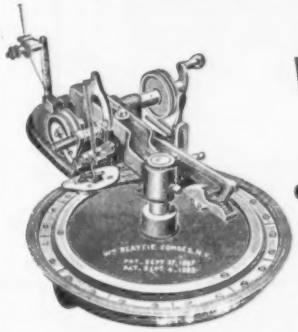
Also full automatic **Two-color Striping Machine** and full automatic combination lace and stripe machine.

AMERICAN KNITTING MACHINE CO.,

Office and Shop, Woonsocket, R. I.

Beatties'

PATENT LOOPERS



Wm. Beattie & Son,

COHOES, N. Y.

An Illustrated Catalogue will be sent on application.

TRADE MARK.

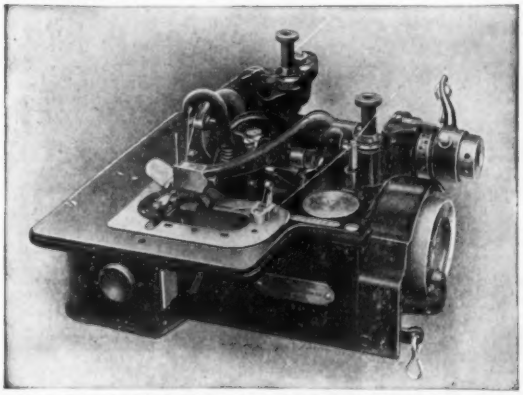
Business Est. In 1859

WILLCOX & GIBBS

"OVERLOCK" Machine.

(TRADE MARK.) (Pat. April 5, 1892.)

Patent twice upheld by the U. S. Court of Appeals.



For Trimming, Seaming (or Hemming, or Overedging) and Covering Raw Edges in One Operation of Knit Underwear and Hosiery; and for making Overlock Corded Edge on Woven Fabrics.

WARNING!

Manufacturers and dealers are warned that not only is the "Overlock" Machine fully protected by our four patents of April 5, 1892, and one of May 26, 1896, but the edging products are also protected by patents of March 10, 1896, and Dec. 26, 1899.

WILLCOX & GIBBS SEWING MACHINE CO.,

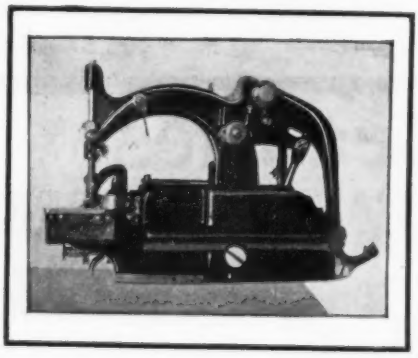
General Offices:

Nos. 85-87-89 Bleecker Street, near Broadway, NEW YORK, N. Y.

Also, LONDON.—PARIS.—DRESDEN.—MILAN.

The Arnold Sewing Machine Co.

216 High Street, NEWARK, New Jersey.



Overedge Welting Machine, ***with Trimmer.***

The very best in the market. (No royalty.)

Overedge Seaming Machine, ***with Trimmer.***

3000 stitches per minute. (No royalty.)

Overedge Sewing Machine, ***without Trimmer.***

For manufacturers of knit goods and other fabrics, with or without trimmers.

Our claims are Simplicity, Durability, Accessibility,

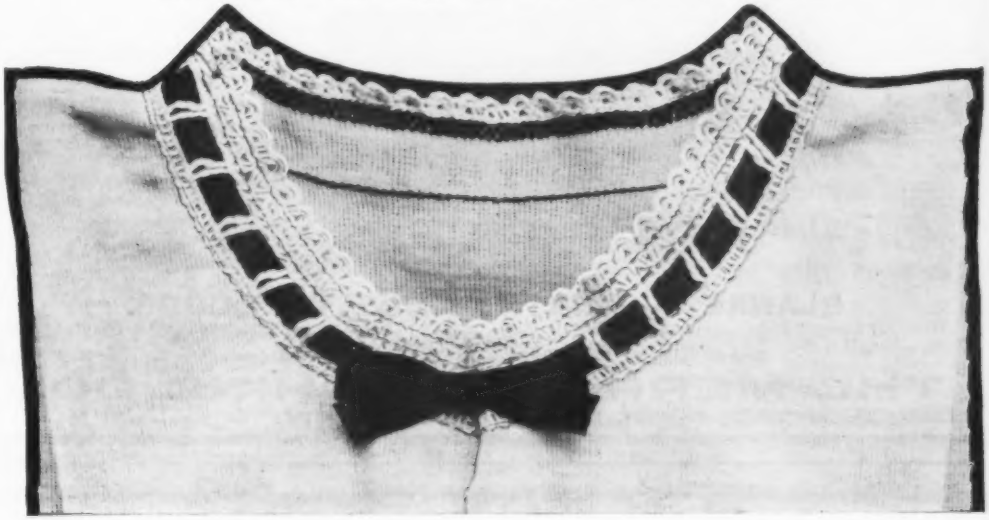
EVERY PART OF OUR MACHINE BEING READILY ACCESSIBLE.

This machine has 100 less parts than any other overedge machine.

Do you use this Collarette Finish?

Union Special Machine Style 12700

Stitches lace on opposite sides of ribbon and covers raw edge of web in one operation.



This is the only machine that will stitch the lace to the garment and position the cross bars of the lace. If you are not satisfied with your present methods and want to reduce cost, and at same time improve quality, write us for samples and information.

Union Special Sewing Machine Co.

CHICAGO. NEW YORK. PHILADELPHIA. BOSTON. AMSTERDAM, N. Y. COHOES, N. Y. ST. LOUIS. CINCINNATI.

WILFRED WELLS,

Sole Manufacturer of the

CHAMPION HOSIERY STAMP.

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The Only Perfect Stamp for Hosiery, Underwear and all Woven Fabrics. BLOCKS FOR PRINTING HOSIERY.

505 W. Lehigh Avenue, . . . PHILADELPHIA, PA.

LACINGS FOR OVERSHIRTS and UNDERWEAR.

Tipped and Tasseled.

Hepner & Horwitz, 30 Howard St., N. Y.

CELEBRATED BRAND PYRAMID TRADE MARK **LACINGS**

For Underwear, Overshirts and Sweaters,

JOHN CATHCART & CO.,

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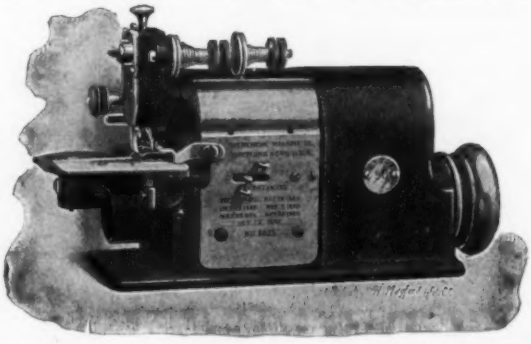
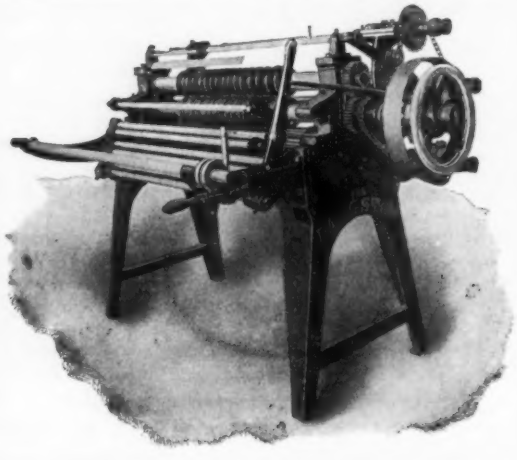
THE CHEAPEST and BEST METHOD
OF
FINISHING RIBBED KNIT GOODS
IS BY THE USE OF
OUR HIGH SPEED MACHINES.



BLANKETS, SKIRTS or COTTON GOODS,
requiring a useful and Ornamental Finish, should be finished by some of our various machines adapted for special purposes and finishes.
Send for Catalogue and Samples, stating the kind of goods to be finished.

THE MERROW MACHINE CO.,
346 Broadway, New York. HARTFORD, CONN. Bourse Bldg., Phila.

MAKE YOUR OWN PAPER BOXES!



SAMUEL M. LANGSTON,
MANUFACTURER OF
Paper Box Machinery.
Supplies Complete Outfits for Knit Goods Manufacturers.
501 LOCUST STREET,
PHILADELPHIA, PA.
Correspondence Solicited.

Stanton & Lewis

CENTRAL STEAM FORGE

316 and 318 Florist St.,

PHILADELPHIA .. .. PENN.

The best equipped shop in the United States for the Manufacture of

Knitting Machine Cylinder

and Sinker Bed Ring Forgings, from the smallest to 30 in. dia. of the best steel.

AMERICAN OVERSTITCH

FOR WELTING, OVEREDGING AND SELVAGE EDGES, FOR SWEATERS AND HOSIERY, KNIT GLOVES, ETC. TO SEW IN SLEEVES. NO TRIMMER.

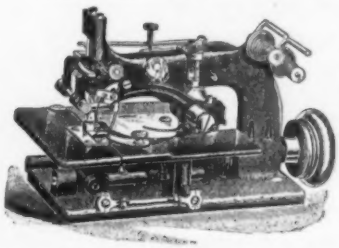
AMERICAN OVERSTITCH MACHINE CO.

18-30 W. RANDOLPH ST. ,CHICAGO, ILL.

—THE—

Champion Rib Knitting Machines

For HOSIERY AND UNDERWEAR



Also Sewing and Trimming Machines, Crochet and Shell Machines, and all other Machinery required in the finishing of Hosiery and Underwear. Complete Plants Installed.

Estimates Cheerfully Given.

Our New Overseaming Machine.

CHAMPION MACHINE CO.,

N. W. Cor. American and Diamond Sts.

PHILADELPHIA.

LEWIS JONES,

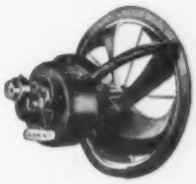
60½ and Media Streets, . . . PHILADELPHIA.

GAS ENGINES for city or country
BRUSHING MACHINERY
KNITTING MACHINERY

EFFICIENT
DURABLE
LOW IN PRICE

"DAVIDSON"
Electric Ventilating FANS

For Every Purpose



Direct and Alternating Current Outfits

Bulletin No. 168-A tells all about them

Massachusetts Fan Co.

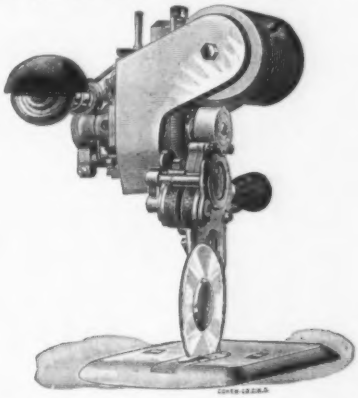
Waltham, Mass.

The "STAR" CUTTER

Shown below is especially adapted

For Knitting Mills.

Cuts Any Shape and Many Thicknesses of Fabrics.



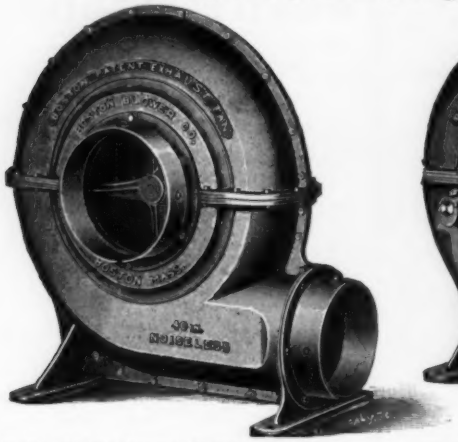
Has ball bearings; requires but 1.6 horse power; uses direct current; patent flexible take-up device. Acceptable to insurance underwriters. Repairs almost nothing. Now in use by a number of first-class knitting mills, to whom reference can be made.

WOLF ELECTRICAL PROMOTING CO.,

810 Main Street, - - Cincinnati, Ohio.

Boston Wool Exhausters, with Removable Tops.

As used in Connection with Pneumatic Conveyor System for Handling Wool, Cotton, Rags, Excelsior, Jute, etc.



Inlet Side of Right-hand Wool Exhauster.

Pulley Side of Left-hand Wool Exhauster.

This machine is similar in design to the regular Boston Patent Exhaust Fan, but is fitted with a special wheel for handling fibrous materials, and the top is removable.

This latter feature is especially desirable when handling wet or greasy materials or in handling anything, in fact, which would leave a deposit on the inside of fan, as the entire top may readily be removed for inspection or cleaning without disconnecting either pipe or belt connections.

BOSTON BLOWER CO., Main Office and Works: **Business and Glenwood Sts., HYDE PARK, MASS.**

WATER WHEELS

FOR ALL HEADS FROM 3 FEET TO 2000 FEET.

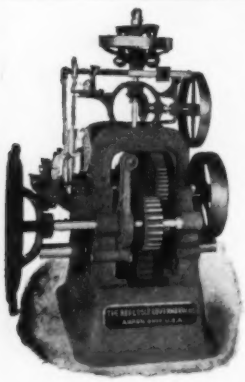
Adapted to all **POWER** Purposes. Easy working balanced gates. We guarantee greatest power with smallest quantity of water, at both full and part gates.

State Head and Power Required.

AUTOMATIC ENGINES

10 to 50 H.P., guaranteeing best possible regulation with highest economy in steam. Pamphlet of either Wheel or Engine sent on application.

JAMES LEFFEL & CO., Springfield, Ohio, U. S. A.



WATERWHEEL GOVERNORS

FOR TEXTILE MILLS
Electric Light, Power and Railroad Work

We are now prepared to **guarantee absolute satisfaction.** Write for references in your locatity.

THE REPLOGLE GOVERNOR WORKS

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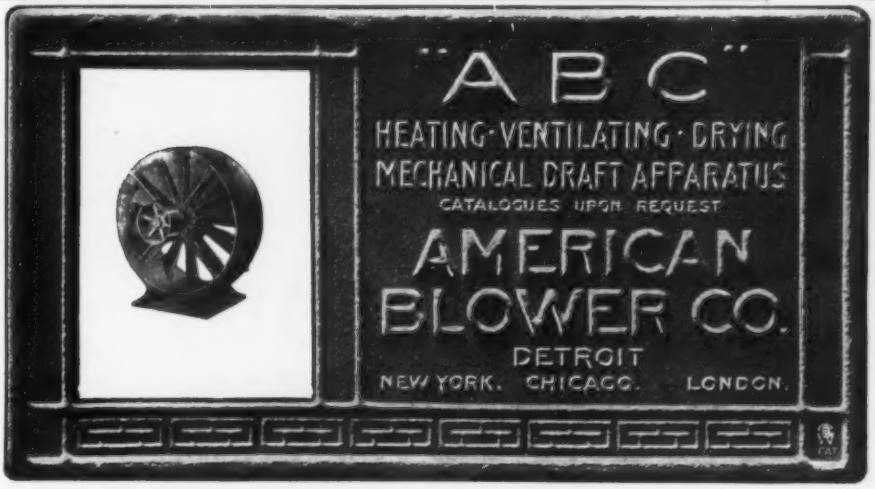

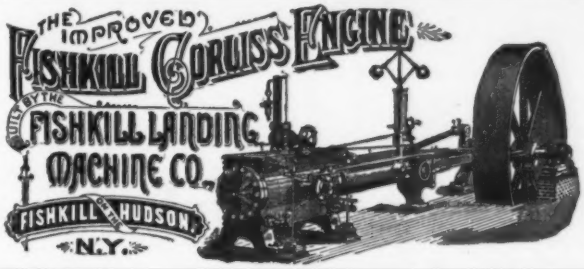

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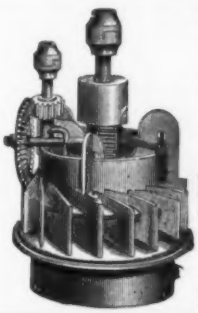
Efficient, Durable and Economical power extant.
For Close Regulation and Noiseless Operation it has NO EQUAL.



TURBINES ON HORIZONTAL AND VERTICAL SHAFTS.

These wheels are specially designed and adapted to **TEXTILE MILLS**

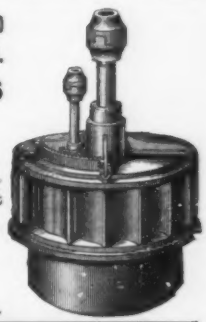
The records of the Risdon Wheel are not equaled by the records of any other wheel. Average of results of tests in Holyoke Flume: Full Gate, .8694; Seven-eight, .8472; Three-quarter, 8014; Five-eig .th, .7601.

RISDON CELEBRTAED TURBINES. ALCOTT HIGH DUTY TURBINE. Unequalled Efficiency. Easy Working Gate. Greatest Power from a Limited Quantity of Water at Smallest Cost.

TAYLOR SLEEVE GATE TURBINE. The largest power ever obtained from a Wheel of the same diameter.

SEND FOR CATALOGUE.

RISDON-ALCOTT TURBINE CO. Mount Holly, New Jersey, U.S.A.



PAIR McCORMICK TURBINES

4,000 H.P., 85 ft. head, arranged to drive generator and a single turbine to drive exciter. Two settings built for the Hudson River Water Power Company's Spier Falls plant and 14 pairs 51 inch for their plant at Mechanicsville, N, Y.

Write for Catalogue if contemplating purchase of turbines.

S. MORGAN SMITH CO.
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Boston Office, 176 Federal Street.

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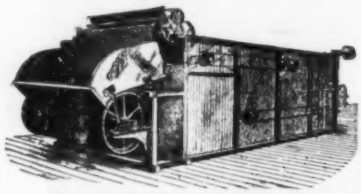
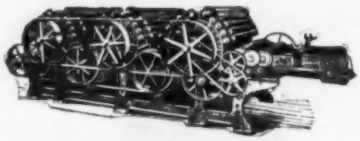


Automatic Cotton Stock Dryer.

Automatic Yarn Dryer.

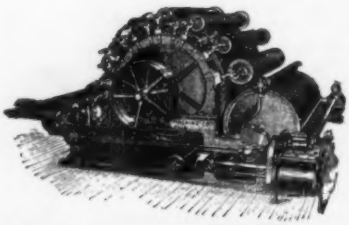
"CYCLONE" DRYERS

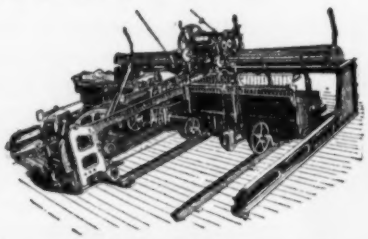
For Cotton Stock, Wool Stock, Rags,
Yarn, Cloth, Underwear, Stockings, Etc.



"PROCTOR"
Garnett Machines and Pickers

For reducing to fibre Cotton and Woolen
Waste, Cloth Clippings, Etc.



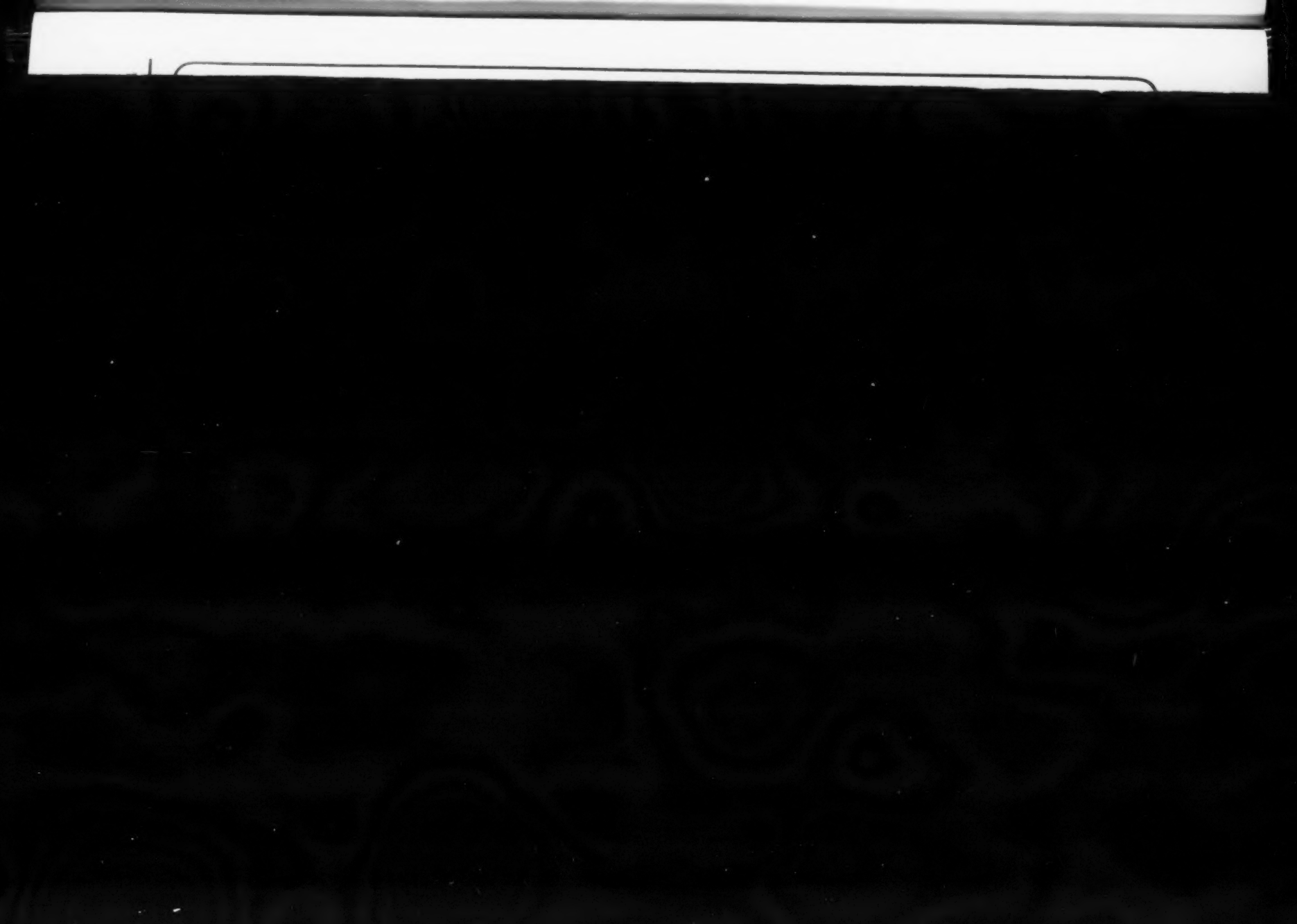


"FURBUSH" Woolen Mill Machinery

Including Pickers, Cards, Mules, Twisters,
Warpers, Dressers, Spoolers, Etc.

Manufactured by

THE PHILADELPHIA TEXTILE MACHINERY CO.,
Hancock and Somerset Sts., - PHILADELPHIA, PA.



The Textile-Finishing Machinery Co.

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BUILDERS OF
ALL KINDS OF

MACHINERY

FOR

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DYEING
DRYING

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FINISHING

Singeing Machines,

Boiling Kiers,

Washers, Squeezers,

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Continuous Chainless

Steamer,

Aniline Agers,

Dyeing Machines,

Open Soapers,

Blanket Washers,

Color Kettles,

Horizontal or Vertical Drying Machines, with Copper or Tinned Iron Cylinders,

Automatic Tentering Machines,

Water and Starch Mangles,

Dampening Machines,

Dyeing Machines for Chain Warps.

Calenders for Rolling, Glazing, Chasing and Embossing, also Calenders for Moire Finish.

Patent Combination Rolls made of Cotton and Husk especially adapted for Soft Finish, Unequalled for Elasticity and Durability.

Cotton, Paper, Husk, Chilled Iron, Brass and Rubber Rolls, Electro-deposited Copper Rolls for all Purposes.

Padding and Drying Machines for Shade Cloths.

Single and Double Cylinder Engines.

Hydraulic Presses and Pumps.

Estimates, drawings and full particulars of complete plants furnished on application

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JAMES SMITH WOOLEN MACHINERY CO.

411 to 421 Race Street, Philadelphia.

Woolen Machinery

FOR

Carding, Spinning, Wool Washing, Carnetting, Pickering, Drying, Burring, Cleaning, Finishing.

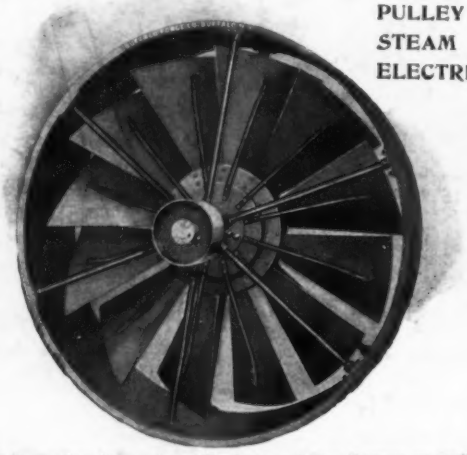
Cotton Batting and Waste Machinery.

FOR MORE COMPLETE LINE SEE PAGE 59.

BUFFALO DISK WHEELS

For Cooling, Ventilating, Drying

TYPES:
PULLEY
STEAM
ELECTRIC



For Removing Steam from Slashers and Dye-Houses as well as all offensive odors common to dying processes. They are largely and successfully employed in cotton-linen and woolen mills for such purposes as well as for preventing harmful condensation of steam in the room.

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New Foster Cone Winder

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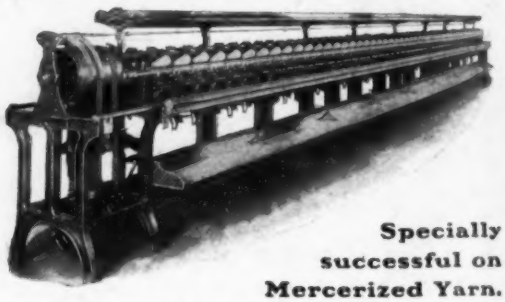

Specially successful on Mercerized Yarn.

Also Tubing, Doubling and Quilling Machines

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VALVES AND FITTINGS

"Walmanco" Pipe Flanges,
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